



FUTURE RESTORATIVE

WORKING TOWARDS A NEW SUSTAINABILITY

RIBA  Publishing

MARTIN BROWN

FutuREstorative

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Published by RIBA Publishing, part of RIBA Enterprises Ltd,
The Old Post Office, St Nicholas Street, Newcastle upon Tyne, NE1 1RH

ISBN 978-1-85946-630-8, 978-1-85946-717-6 (PDF)

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British Library Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library.

Publisher: Steven Cross
Commissioning editor: Elizabeth Webster
Production: Richard Blackburn
Designed and typeset by Ashley Western
Printed and bound by W&G Baird Ltd in Great Britain
Cover image: Consult Development

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COVER IMAGE NOTE

The monarch butterfly is considered an important and iconic pollinator, native to North America with a multigenerational migration journey that spans from Mexico to Canada. From a population of more than 1 billion in the 1990s, there is a grave danger of extinction within 20 years as the monarch's sole food source milkweed, is virtually eradicated through chemicals, and genetically modified agricultural practices. The monarch butterfly is increasingly seen as a symbol for hope for a restorative future, championed, for example, by the David Suzuki Foundation¹ through their #GotMilkweed campaign.

The classic butterfly effect (the movement of a butterfly wings triggering storms on the other side of a continent) has become a metaphor for chaos theory describing the concept that small, seemingly insignificant actions can have larger, very significant consequences. And now the butterfly diagram, central to circular economy thinking, illustrates the potential to transform the built environment.

In many ways, the monarch butterfly sums up FutuREstorative, as a symbol of biodiversity and fragility but with potential for amazing transformation

¹ <http://www.davidsuzuki.org>

**For Dad (Norris John Brown, 1932–2013),
for passing on his 'make and make do' philosophy
that today would be called circular economy thinking.**

**For Mike (Mike Wigglesworth, 1958–2015),
for sharing mountains, outdoors and geekery.**

THANKS

A thanks to all those who have inspired, encouraged and contributed to FutuREstorative, including friends and followers across numerous social media platforms.

Thanks to Elizabeth Webster (RIBA editor) for guidance and support, Soo and Tom for patience with my endless testing of thoughts, and Chris for support on research.

CONTENTS

FOREWORD	IV
INTRODUCTION: 'STAY HUNGRY, STAY FOOLISH'	1
CHAPTER ONE: THE CHALLENGE	9
CHAPTER TWO: FUTURE RESTORATIVE KEY CONCEPTS	29
CHAPTER THREE: HEALING THE FUTURE	37
CHAPTER FOUR: RESTORATIVE APPROACHES 1 NATURE, EARTH, AIR AND LIGHT	65
CHAPTER FIVE: RESTORATIVE APPROACHES 2 ENERGY, WATER, MATERIALS, WASTE AND CARBON	83
CHAPTER SIX: THE NEW 'SUSTAINABILITY' STANDARDS	115
CHAPTER SEVEN: A DIGITALLY FUELLED RESTORATIVE FUTURE	137
CHAPTER EIGHT: FUTURE RESTORATIVE RESOURCES	153
EPILOGUE: 'IT'S JUST SUSTAINABILITY'	169
INDEX	170
IMAGE CREDITS	172

FOREWORD

We are, it is now recognised, living within the Anthropocene age: an age when human activity is a dominant impact on the earth's ecosystems. Our built environment sector is both the cause of and provider of solutions to the climate change problems we face today. Yet, despite great efforts, our sustainability performance indicators are worsening. Moving towards a restorative future is not a luxury but an urgent imperative.

The Living Building Challenge, presenting a pathway to a restorative and Living Future, is still embryonic within the UK. However, through the work of Martin and members of the UK Collaborative – many of whom are included in the impressive list of contributors – it is rapidly gaining traction.

I was delighted to be at the launch of the UK Collaborative back in 2013 and it is hugely encouraging to see the first registered project, to see organisations taking the first steps to register within the ILFI JUST programme and the increasing interest in the ILFI Declare and Living Product Challenge material programmes.

And key to a restorative healthy future, central to **FUTURESTORATIVE** and the Living Building Challenge philosophy, is our relationship with nature, through the understanding and application of approaches such as biophilia, rewilding and biomimicry.

In this book, Martin draws on experience from a career in the built environment, a lifetime of outdoor activity, surfacing concepts from ecology and wildness writers and thinkers alongside today's leading advocates and innovators. There are many examples, concepts and arguments presented here that you will love, like and agree with. Others you will not, and will want to challenge – and that's fine. We need more thinking like **FUTURESTORATIVE** that challenges current and entrenched thinking and, in encouraging debate, moves us forward.

Like the Bullitt Centre, a flagship Living Building Challenge project, our home at the ILFI and a project that has inspired much within this book, **FUTURESTORATIVE** will open doors so that others may follow, apply new thinking to design, build and operate buildings that are truly regenerative, and join us on our journey to a Living Future.

AMANDA STURGEON

FAIA, LEED Fellow

CEO International Living Future Institute

CHAPTER ONE

THE CHALLENGE



THE PAST

Has anyone else noticed there is an increasing sense of having arrived at some sustainable destination? You might think so, reading client reports and blog posts proclaiming green credentials of that latest project, designers and contractors boasting of innovative sustainable approaches, and with just about every construction material now having some wonderful green credential.

While there is no doubt that we have made great progress, there is danger in thinking of sustainability in any other terms than as a journey. We are only now beginning to understand what sustainability means, only now sorting out route maps and equipment and lacing up our boots for a journey whose destination is as yet uncertain.

Case studies of projects are by and large written just after the construction, so sustainable aspects incorporated describe intent, rather than proven and tested approaches. They are often written as PR material, rather than to inform and progress sustainability. We need far more case studies that show sustainable performance 12 months, 12 years, 120 years into the life of a building, when it has been tested by inhabitants,¹ changed hands a few times, been modified, updated, even up-cycled.

Contractor sustainability claims are arguably slimmer than project case studies – largely based on great policy and strategy intent and having the project management skills to incorporate sustainability technology designed, manufactured and incorporated into the building by other specialists. Where are the case studies highlighting contractors who take the extra step – whether it be innovating with their supply chain off line, developing sustainable approaches to reduce waste, or greening their offices and site accommodation to reflect their values and policies? Far too often contractors will do only what is required by contract, by BREEAM or LEED, and will not do it where it is not required.

OH DEAR: WHAT HAVE WE DONE?

The influence of the built environment on just about every other sector is immense. In addition to its *footprint*, acknowledged as the impact on the environment, we should also really understand its *handprint*, i.e. the positive good we do and the impact we have on those we work with, come into contact with or influence.

In the opening chapter of *Cradle to Cradle: Remaking the Way We Make Things*,² Michael Braungart and William McDonough detail an excellent critical parody description of the design criteria for the Industrial Revolution. Similarly no one starting out to design a built environment industry today would include today's negative impacts. Yet somehow along the way we have incorporated and accepted negative impacts as necessary products of the way we do business.

Within the built environment industry, we are experts at creating proposals, presentations, pitches and bids; indeed, for the majority in the sector, it is often the only way to win work. We know what is required by the client, by legislation, by common sense and by those intuitive, unwritten rules or governance for nature and the environment. Yet what we pitch and what we as an industry offer can be very different.

Imagine then, if we were to be brutally truthful and honest in our pitches and bids, we may find ourselves saying:

GOVERNMENT / CLIENT / OWNER

We are aware that our buildings may well become 'sick building syndrome' places, but we need to give priority to cost, programme and availability of materials.

We procure buildings based on the lowest build cost, knowing that running costs, and in particular the energy costs, may escalate. And in the case of domestic property, knowing this will push more people into fuel poverty.

We have created a fragmented sector that now struggles to collaborate and to innovate and hence we accept lowest denominator solutions.

We set up national and regional strategy groups, and develop industry strategies and targets that aim to only make us incrementally less bad.

Concepts of zero and net-positive have been and will continue to be debated, and included in selection criteria – but little will be done to enforce them.

DESIGN

We will continue to be a fossil fuel dependent sector, locking our clients and future-generation users of buildings in to a fossil fuel dependent future.

We struggle with understanding net-positive approaches to design-build.

We are aware that we have designed, built and maintain buildings with poor light and poor air that contribute to poor health, increase staff absenteeism, lower productivity and hence increase running costs for our client's business.

We have designed buildings that discourage users from taking the stairs by placing lifts prominently in the lobby and enticing visitors with shiny 'Ride me' signage.

CONSTRUCTION

We have created millions of tonnes of waste, hidden it in the ground, and will continue to do so where we can. We know that most of it will not decompose but are sure that this problem can be solved by future generations.

We have a culture of low sustainability aspirations, only doing what legislation or the contract demands, rarely doing the right thing for the planet at our expense.

We have created dangerous and harmful work places through construction methods and use of toxic materials.

We create high levels of stress through onerous travel demands on staff.

We employ some of the best project managers and supervisors in the world of construction, and require that they spend their careers in site accommodation with poor daylight and no greenery – yet we build healthy buildings for our clients that foster creativity, health and productivity.

As contractors we invest little in R and D to develop sustainability approaches, relying instead on the requirements of the client to drive sustainability, and develop our skills.

In the interests of lowest build cost we value engineer out sustainability approaches and technologies that have been carefully designed in yet have a high capital cost, even when we know that they bring real life-cycle cost and environment benefit, leading to higher fuel consumption and reduced fitness.

MATERIALS

In the interest of cost and durability we continue using toxic materials even in the face of overwhelming scientific advice, and our own policies of doing 'no harm'. We are aware that our sector has caused lethal illnesses for workers, in the production, installation, removal and treatment of certain materials as waste.

Despite claims of localism focus and of responsible construction, we specify, procure and transport materials around the UK, often based on lowest cost of purchase and availability. Yet we know that 30% of all traffic is construction related, and 70% of a project's carbon footprint is transport related.

KPI HEADLINE PERFORMANCE: DESPITE DECADES OF SUSTAINABILITY AND ENERGY EFFICIENCY RESEARCH AND DEVELOPMENT...

We rarely achieve design performance when the facility is in use. As a sector we have invested much in researching, understanding and attempting to close the Performance Gap.

Carbon emissions of the construction build process have increased.

We struggle to meet waste reduction targets, either in waste generated or waste to landfill.

We do not know the carbon footprint of the UK construction sector.

We do not know the carbon footprint of our organisation.

We are aware that the biggest impact we have on the environment is through travel, yet consider it too difficult to really understand, monitor and reduce.

We do not know the true cost of our organisation, buildings or activities to the ecosystem.

ON CLOSING THE LOOP

We are not so good at learning and ‘closing the loop’, but we do try. ‘Lessons learnt’ exercises are useful... when we have time to do them.

Despite monitoring construction KPIs since Rethinking Construction and environmental KPIs since the built environment sustainability strategies of the 1990s, we rarely close the Deming Cycle loop of Plan, Do, Check, Act. We nearly always get bogged down in the checking, not acting to improve, so each project is planned with the same thinking as the previous one.

OK, so this is a harsh and very much worst-case scenario. Many organisations and projects within the sector demonstrate elements of excellence. Yet there are many elements of truth here too. While the sector has evolved, changed and been shaped by powerful factors (political, economic, legal and technical), we do have an industry largely designed by those within it.

EVERY PROJECT MATTERS

However, while we can see exemplars in large or high-profile projects, it is in the ‘long tail’ of construction that we are more likely to hear the comments listed above, and where the greatest sustainability impact can occur.

.....
It really is time to move away from the notion that sustainability is only for big, high-profile projects.
.....

In construction, we regularly hear reasons not to employ sustainability approaches in small projects. These reasons may come from the client (*‘We only demand sustainability management on projects over £5m’*), from the contractor (*‘We only apply Site Waste Management on projects over £300,000’*), from the subcontractor (*‘We only use sustainable timbers on larger projects or when asked’*) or from the architect (*‘The project is too small to consider BREEAM Very Good’*).



THE 'LONG TAIL' OF CONSTRUCTION

Figure 1.1 The term 'long tail', based on statistical distributions, has gained popularity in recent times as a description of the retailing strategy of selling relatively small quantities of a large number of unique items – usually in addition to selling fewer popular items in large quantities. The 'long tail' was popularised by Chris Anderson in an October 2004 *Wired* magazine article.

The 'long tail' of construction helps us understand why every project matters when it comes to sustainability: collectively, the smaller buildings, houses, office and school extensions and beach chalets can have a greater impact than the high-profile, larger projects. This thinking then suggests it is the projects in the 'long tail', not just the higher-value and higher-profile projects, that must have appropriate sustainability standards applied, proportionate to the collective impact.

THE 40% INDUSTRY

Somewhere, somehow, in recent years the built environment sector has picked up the label of being the 40% sector, based on its (mostly) negative impact on the environment. Whilst many of the 40% 'claims' may be seen as anecdotal, even urban myth, they are very close to research based evidence, performance data or published papers.

CONSTRUCTION: THE 40% SECTOR

The built environment generates around 40% of all carbon emissions in the UK.

Construction accounts for 40% of the total flow of raw materials into the global economy every year.³

40% of a nation's health costs are attributable to the built environment.

In 2014, 41% of total US energy consumption was consumed in residential/commercial buildings – about 40 quadrillion British thermal units.⁴

Construction consumes over 40% of Europe's energy and resources.

The built environment accounts for 36% of EU CO₂ emissions and 40% of total EU energy.⁵

Lighting represented about 25% of energy use in 2010 and nearly 40% of carbon emissions within the non-domestic sector.

In 2050, capital city carbon will represent nearly 40% of the built environment's emissions (versus 18% in 2010).

40% of construction carbon is locked into material and waste transportation.⁶

Over recent years a number of events and conferences have been held to explore the 40% figure. Perhaps there is even a sense of pride in the 40% tag, rather than a sense of guilt. We should not and cannot be satisfied with targets of reducing carbon by 40% by 2025, for example, or reducing waste to landfill by (just) 50%, as stated in recent strategies.

We need the thinking, courage, leadership and aspiration within the whole industry to turn this around – with aspirations to become the 40% net-positive sector. To consider this impossible is to view impossibility as a fact, not an opportunity or challenge.

HAVE WE WASTED A GOOD CRISIS?

‘What’s in store for me in the direction I don’t take?’

JACK KEROUAC

Never Waste a Good Crisis was a short publication from Constructing Excellence (2009) that focused on collaborative working within a period of recession, developing skills and strengths and importantly relationships, ready for the emergence from the recession into what was anticipated to be – and turned out as – a new era of construction.⁷

During this period of slow activity, we wasted the opportunity to address any maturing of the sustainability agenda. In the 2008–2013 recession, clients, architects and contractors shed staff and saw sustainability as an unnecessary burden and a drain on reducing resources. Now, emerging from that recession, we hear that organisations are just too busy to develop sustainability skills, and that resources remain stretched from the recession’s impact.

In a number of workshops and presentations that stretch back to ‘business improvement’ roles and Total Quality Management days, reference has been made to the very clever ‘square wheels’ approach from squarewheels.com.⁸ In a 2013 blog post, I used the expression ‘pedalling squares’ to illustrate how progress and development in sustainability is often a clunky and inefficient activity.



Figure 1.2 New circular improvement tools now available to built environment sustainability.

There is so much to say about square wheels. The obvious is that we struggle to run our organisations on square wheels and clunky approaches, when the more efficient round wheels are available – we know about them, but they are just not used.

Within construction we have some great new round wheels available to us that will improve our business, our services to clients and our image – for example the tools of BIM, social media and concepts of circular economy and restorative sustainability. These nice new shiny round wheels – carried, or in the store room and not used – are necessary in a construction organisation’s baggage. Of course we may take them out and fix them temporarily to the business for PQQ (Pre Qualification Questionnaire), PR and interviews to demonstrate a sense of being tuned into current industry improvement programmes, but then we remove them for business as usual, running once again on square wheels.

SUSTAINABILITY SQUARES⁹

For me, one of the best recent cycling reads has been *Velo* by Paul Fournel,¹⁰ a collection of zen-like thoughts on all things cycling. From one of the brilliant posts, ‘Circles’: *‘To ride a bike is to make circles. You have to think about that when you pedal, as a little reminder the movement of the legs is circular, you have to grant it this and turn the cranks roundly.’* Cyclists have a sense of this. As soon as the cadence falls and fatigue mounts they say they are peddling squares. In fact, cyclists have their own gyroscope, producing not only movement but equilibrium. The faster you turn your legs, the more harmonious this equilibrium becomes.

And so it is with sustainability, or should be: to keep moving forward, we need to keep circling. Think about William Edwards Deming’s ‘Plan, Do, Check, Act’ circle as a means of keeping improvements in equilibrium. The swifter we can progress, the greater the sustainability equilibrium, where all ‘competing influences are balanced’. If we slow, become distracted or fatigued, sustainability efforts are no longer circular and become square, cumbersome and energy sapping. And if you stop, you fall off ...

LEAN AND SUSTAINABILITY

Construction largely missed out on the Total Quality Management and Benchmarking era of continuous improvement of the 1980s and ’90s.

As a TQM and Benchmarking practitioner in the 1990s and 2000s, I heard repeatedly that as the built environment is so different from any other sector, what could it possibly learn from outside the sector? As we shall see throughout this book, there is indeed plenty to learn and adapt from other sectors in the world of sustainability, and the industry may be shifting from ‘learning for improvement’ to ‘learning for survival’.

The built environment dabbled in TQM, enjoying the problem-solving tasks, and quality circles. But TQM never became the strategic improvement priority that it did in other sectors that embraced such approaches and, through learning from other sectors, transformed their own. The legacy of the 1990s improvement era continues as a lone voice in the built environment sector, promoting powerful topics such as lean construction, last planner, even lean BIM, but the use of the classic TQM tools such as Kaizen or Six Sigma to deliver 99% right first time is very much a rare thing in today's construction industry.

Honda ran an advert in 2010 with the catch line 'Everything we do goes into everything we do'. Unfortunately, taking into account its 30-40% waste and with productivity as low as 60%, the built environment sector is far from making such a claim.

Without the TQM or lean management foundation of other industries, the construction industry is at a disadvantage in moving forward on a number of fronts relating to sustainability. Barriers to improving sustainability include the lack of skilled facilitators and a lack of understanding of root cause analysis.

COST – THE SUSTAINABLE CONSTRUCTION BARRIER

.....
'We have to transition from a distractive economy, to a regenerative one.'
.....

IBRAHIM SALIH - AT LF15 CONFERENCE QUOTED IN TWEET BY ERIC COREY-FREED

We know from the work of Nicholas Stern that the cost of addressing climate change issues will be greater tomorrow than it is today if we don't act now. And so it is within the built environment sector. We know the influence and leverage of buildings on business and occupant expenses, not to mention health, through models such as 1:5:200.

1:5:200

The expression '1:5:200' originated in a Royal Academy of Engineering paper of 1998, 'The Long Term Costs of Owning and Using Buildings',¹¹ where it was used as a guide to illustrate the cost of ownership of new office buildings. If the capital construction cost is a unit of 1, the facilities management cost will be a factor of 5 and the operating costs a factor of 200, over a 20-year life. 1:5:200 has also been used to illustrate the leverage and impact of sustainability factors across the design, build, facilities management and operating industries within an integrated built environment sector. 1:5:200 has fostered much debate and argument as to its accuracy and usefulness; however the paper's principal message – that concentration on capital cost alone is not providing user or occupant value – is sound.

Ultimately, the economics of green construction and then restorative sustainability will become so compelling that financial change will have to happen. It's how we as an industry prepare for that transition and manage the consequences of change that is important.¹²

From research attached to the Bullitt Center in Seattle (acknowledged by many to be the world's greenest commercial building), we now know that deep-green buildings can pass financial tests and that a *'compelling case can be made today that very-high-performance, deep-green buildings can pass financial tests while also delivering a valuable stream of mission-oriented "external" public benefits'*.¹³

How then can we make the switch to fully addressing restorative sustainability costs with a project budget? Imagine a world of construction where the lowest common denominator position is for sustainability measures to be *added* into the project through value engineering exercises, rather than at present *removed* through value engineering to meet budgets.

Nudge behaviour theory argues that positive reinforcement and indirect suggestions to try to achieve non-forced compliance can influence the motives, incentives and decision-making of groups and individuals, at least as effectively – if not more effectively – than direct instruction, legislation or enforcement.

Aligned to nudge behaviour is the wonderful Kano 'Delight Theory', which illustrates that what delights us today, and what we will pay more for today, will become an expectation for which we will not pay tomorrow. Examples are seen in the world of white goods and the auto industry, where seat belts, airbags and GPS within cars that once delighted are now expected. And so it has been and will be in buildings regarding health, energy and fitness for purpose. What are considered delights at the moment – whether it be low energy costs through PassivHaus, toxic-free buildings through Living Building Challenge or buildings that foster good health through the WELL Building Standard – will become tomorrow's expectations, and at no additional cost.

But do we really have the luxury of time to nudge? We are starting to understand from models such as the Living Building Challenge what good sustainability means. We have amazing digital BIM-related modelling tools to know what 'good' looks like. We know the cost of good – and we know the real cost of sustainable construction.

However, through the twisted approach of value management and value engineering we reduce 'good' and shoehorn sustainability into project budgets.

Project costs and programmes have become incrementally bloated over recent decades through acceptance of bad, unproductive and wasteful practice. These bad practices include the usual reworking, drawing re-iteration, waste, coordination, poor information flow, communication, attendance, skills and time loss, to name a

few – issues that construction project management staff firefight on a daily basis. Having accepted these practices as normal, we seek to include them in the cost of the next project, and they easily become the cost of the way we do things. And in doing so we divert cost away from achieving the ‘good’ originally envisioned.

The Bullitt Center’s original vision of a fossil-fuel-free building was held firmly by Denis Hayes, who repeatedly turned down design proposals that included fossil fuel options. Such commitment, patience and rigidity from Hayes resulted in design and construction teams innovating to realise his vision. The Bullitt Center would have been a very different building had design teams concluded it was impossible and not sought alternatives, or had the project team compromised and shoehorned their vision into lower budgets.

The next generation deepest green buildings must extend this commitment, patience and vision to the construction phase. They must not accept value engineering that reduces value, not accept waste as an option, not accept the use of fossil fuel in construction. Innovation will only develop from strict standards which prohibit unsustainable practices.

Imagine if we could deliver net-positive sustainable projects that are less costly.

Building on previous industry collaborative cost development thinking, we can deliver improved value and ‘good’ at the right price. But we must urgently re-examine and eliminate the Muda costs associated with construction. (Muda is the brilliant Japanese term encompassing all kinds of waste, from quality issues to material waste, wasted time, energy, water and more.) In fact we need to go further than eliminating, and move into a restorative sustainability thinking mode where, for example, we are not focusing on reducing waste, but on constructing with less material.

If, as research and data is showing (see page 20), Muda in construction can be in the region of 30-40% or more, it is essential to attack this element through lean thinking. Then, rather than ‘reducing ‘good’ to fit current wasteful practices’, we can afford ‘good’ at a lower cost, or potentially reclaim that wasted 30–40% to afford ‘good’.

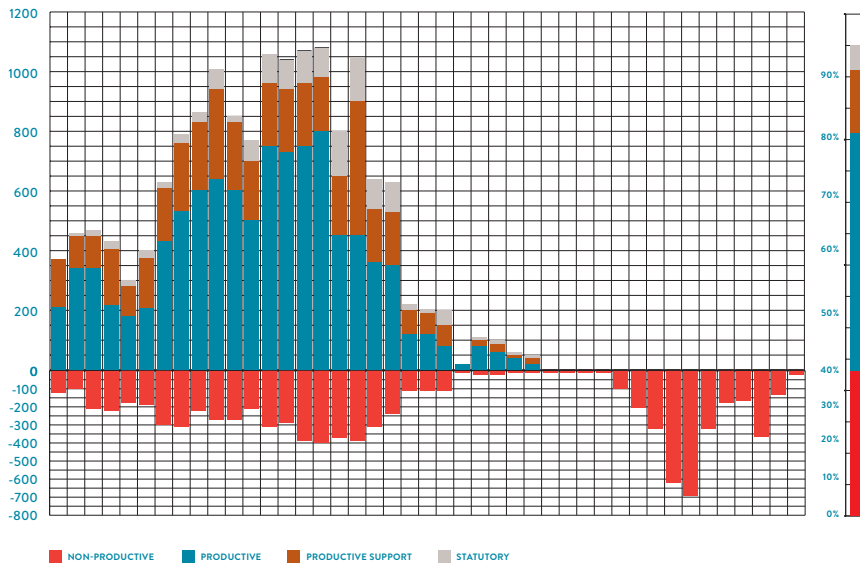


Figure 1.3 Construction: 37% unproductive. Source: IBE Partnerships

POOR LEADERSHIP IS THE ROOT CAUSE OF CONSTRUCTION MUDA

Drilling down, asking (more than) the Five Whys, we can come to understand the root cause of Muda.

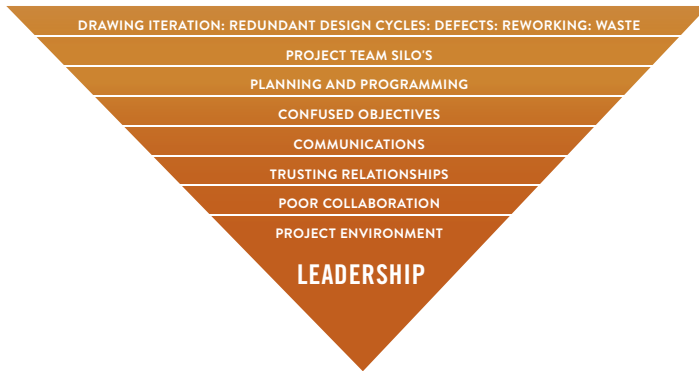


Figure 1.4 Poor Leadership is the root cause of construction Muda. Source IBE Partnerships

Reducing Waste, then, should be the construction industry's biggest contribution to the sustainability agenda, and a key aspect that should be included in sustainability processes and standards. If responsible construction is about providing sustainability, then restricting or preventing sustainability through wasteful, unproductive costs is irresponsible, and something we in the construction sector should be ashamed of.

Alongside the brutally honest pitches that opened this chapter, what if we were honestly accountable to building users? *‘We’re sorry you didn’t get the sustainable, deep-green building you envisioned and that your fuel costs will remain high, but our wasteful processes and practices distracted too much from the project costs.’*

Unfortunately it is the prevalent lowest-cost procurement mindset that presents one of the biggest barriers to green building. Current accounting and costing practices are compromising future generations, preventing future building users and occupants from achieving the necessary green lifestyles and, at worst, keeping many in fuel poverty.

THE CHALLENGE – A RESTORATIVE SUSTAINABILITY COST MODEL FOR CONSTRUCTION

From Alfred Bossom through Building Down Barriers, Constructing Excellence to Construction 2025 we have nearly 100 years of research, evidence, industry thinking and strategy to reduce costs and add value.¹⁴ Yet the cost-value relationship remains poorly understood, particularly when it comes to adding sustainability value.

Let’s look at a simplified model of arriving at a construction price, and a model for pricing restorative sustainability:

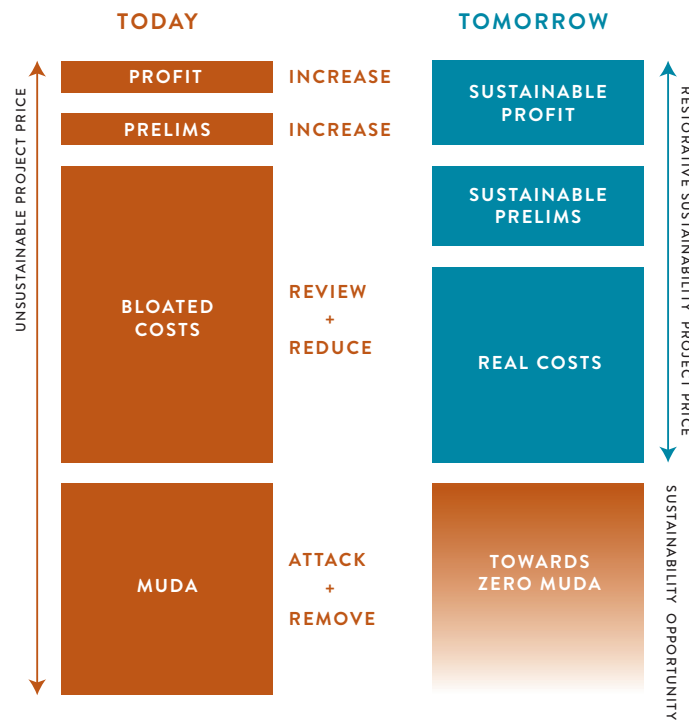


Figure 1.5 A restorative sustainability cost model: the construction price of a project

Current Approach – The ‘Old Way’

- **Profit – competitive:** Most often determined through competition, and reduced to the lowest possible to win work. Low profit for the contractor and hence the supply chain at best inhibits sustainability. Increased profit enables sustainable growth and development, staff training and innovation, and social responsibility.
- **Overheads – competitive:** Again, determined most often through competition to the lowest possible overheads in order to win work. Low overheads and prelims inhibit sustainable management on projects, whereas improved correct-level margins enable more sustainability resources, such as a sustainability facilitator, green accommodation, green travel and more.
- **Competitive costs – The labour plant and material costs:** developed uncollaboratively, in competition, which results in lowest cost and inhibits sustainability. Not reflective of the real cost of doing the work, as bids are often bloated by including unproductive practices carried from one project to the next.
- **Muda – ‘Everything we do that doesn’t go into what we do’:** The time, effort, material, waste and energy used on the project and which do not contribute to the final building. The 2005 time and motion study undertaken and illustrated in Figure 1.3 shows time wasted on projects can be 37%. Reducing the Muda to zero through lean construction approaches should be the objective of every project; to call this impossible is only a mindset. Releasing Muda costs will generate the levels of profit and margin that will enable sustainable construction.

And note that Muda is the zone that gives the most worry, whether it’s stress from firefighting at site level or boardroom angst when projects go wrong. If we are concerned with addressing the image of construction and reducing stress levels on site, this is the key area to attack.

A New Approach – A Restorative Sustainability Cost Model

- **Sustainable profits** – Fixed, agreed, what the organisation needs to develop sustainability, to invest in training, research and development
- **Sustainable margins** – The correct level of margins for the project, ensuring correct sustainability infrastructure, accommodation, facilitation, training, continuous improvement
- **Sustainable costs** – The real costs—the lean costs—of doing the task(s) with no historic unproductive element
- **Sustainability opportunity costs** – The balance, derived from any remaining Muda. Ideally targeted at 100% of the original Muda cost.

WHERE ARE WE? ... FROM GREY TO BRIGHT GREEN

We all approach sustainability from different perspectives, and with differing senses of responsibility. To understand these perspectives and their impact, the author has used the Fairsnape 'Grey to Bright Green' exercise in workshops and consultation as a starter for discussions on sustainability strategy over the last decade.¹⁵ It asks questions about where we really are, where we should be, and where our staff, our clients, the next generation or our children think we are.

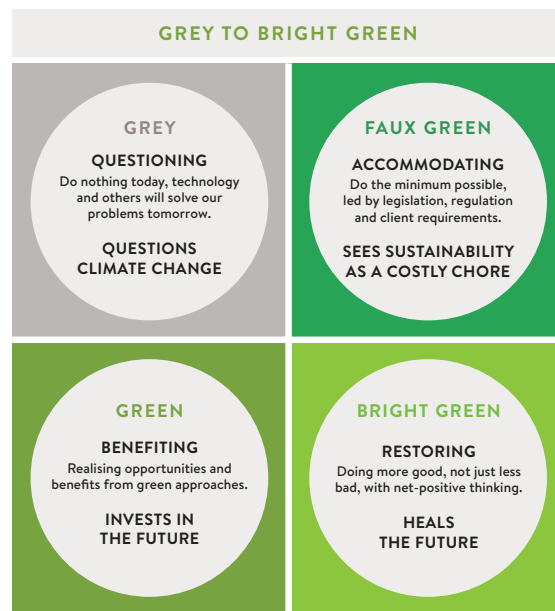


Figure 1.6 Grey to bright green

Grey: A cornucopian perspective, one that questions climate change and the need for sustainability, the cup of sustainability will continue to refresh itself. There is no need to change approaches today as some innovation or new technology will come along tomorrow and make everything OK. It's easy to understand this approach given the daily promises of technology that will solve our problems, such as carbon capture schemes, meaning we can continue as before, using fossil fuels.

Increasingly we see fewer and fewer people or organisations voting for this position, but there are still strong voices advocating that we need do nothing today.

Perhaps a current construction misapprehension is waste to energy. After years of effort to achieve KPIs in diverting waste from landfill through site waste management plans, segregation on site and other approaches, we can now ship everything to a waste-to-energy plant, knowing we will have 100% diverted from landfill on the waste reports. We can then proudly report this to clients and frameworks, include the figure in PQQs and display it on site office walls.

The grey end of the spectrum also includes those who may not be deniers but just don't see the point in making any effort to address sustainability or environmental matters. Those at this end of the spectrum can tend to sap energy from those they work with, preventing them from progressing with their own sustainability goals.

Faux green – An accommodationist perspective. Until recently the more common, and in some groups the only perspective on sustainability. It is one that seeks only to accommodate the minimum required, to accommodate legislation or contractual requirements, with little or no change to the way they do business.

Whenever this exercise has been held within the built environment groups, most delegates recognised themselves or their organisations as having an accommodationist perspective, driven by legislation, contractual or standard requirements. We are legal, runs the thinking, and we met client requirements; why should we do more?

A key aspect to this pattern of thinking is where sustainability and corporate social responsibility (CSR) sit within any organisation. If, for convenience, they sit alongside Health and Safety functions, they may always remain a bolt-on, making it difficult for sustainability to take on a role with a strong voice at board level.

Not surprisingly, those who see themselves as accommodationists also see environmental and sustainability activity as a burden, a costly chore that yields little or no return on investment. In fact there is often little investment over and above that required, with development issues on the project often addressed with client or project money.

Green – A benefiting perspective. Thinking is based on the premise that sustainability makes good business sense, moving beyond the minimum and starting to embed CSR within the organisation. CSR and sustainability, as functions, sit at the centre of the organisation; there is often a dedicated CSR post with a voice at board level. Business impact understanding goes beyond the environmental and includes assessments on, for example, diversity or equality impact.

Encouragingly we now see more companies in this category. They see the benefit of investment in sustainability, whether that's in people or resource investment. The benefits may be business related, in terms of winning work, or improving the organisation's green image.

Bright green – A restorative thinking perspective, stemming from a realisation of a greater holistic good as the driver for sustainability approaches, alongside a recognition of connection with nature or the planet. This is the camp of the net-positive thinkers, those that understand ecology-founded, restorative sustainability, and those who, aware of the wider benefit to nature, the environment, communities and society, seek payback beyond that which returns to the organisation. Often passionate advocates, who inspire and zap energy to (rather than sap energy from) those with whom they work.

TIME TO MOVE ON, THE PAST IS ANOTHER WORLD ...

We can and must reignite sustainability, set the sustainability soul on fire, make sustainability fun and exciting, and inspire a new generation – not only for a vision of sustainability that is regenerative but a vision that also acknowledges the damage of the past and makes amends, healing the future.

A World of Solutions

Within the built environment we may never face an ecological challenge as big as we do today, and without intervention the challenge will likely only grow in difficulty and cost. As Jason McLennan pointed out in his first UK keynote speech (London, October 2015), urgency is required: *'We have to address all problems, for the one we don't address will be our undoing.'*

Fortunately, we have accessible new tools, fresh approaches and inspiring thinking at our disposal, easing the transition to a new age.

We are in the process of rethinking sustainability leadership, rethinking education, rethinking built environment design, rethinking construction process for an ecological age. And importantly we are rethinking buildings and structures as healthy, living entities: as living buildings.

Improving the image of construction is high on the agenda at the moment on many levels, from reputation to career attractiveness and construction visual image. We can remove the stress, the problems, the waste, and lift ourselves from a downward spiral of problems to an industry where every act of construction makes the world a better place. It is not impossible. It is happening already, in many deep-green projects around the world. And as Denis Hayes, Bullitt Center Foundation and Earth Day co-founder stated in a 2015 interview as part of the Sustainability Leadership Conversation series, '*Once something exists we can no longer say it's impossible.*'¹⁶ Impossible is just a challenge, and we relish challenges in construction.

To paraphrase the philosopher Martin Heidegger, '*To build a new vision of the world, we need to understand what it means to live in it.*'¹⁷ The following chapters set out inspirations and challenges, case studies, possible routes and approaches for moving on from the past, enabling us to start designing, constructing and living for the built environment sector we want. And in which every single act will matter.

¹ Inhabitants – an emerging term for occupants in deep-green buildings who inhabit a designed and constructed eco-system

² Braungart, M., and W. McDonough, *Cradle to Cradle: Remaking the Way We Make Things*, New York, North Point Press, 2002.

³ <http://www.businessandbiodiversity.org/construction.html>

⁴ <http://www.eia.gov/tools/faqs/faq.cfm?id=86&t=1>

⁵ <https://ec.europa.eu/energy/en/topics/energy-efficiency/buildings>
www.constructco2.com

⁷ <http://constructingexcellence.org.uk/resources/never-waste-a-good-crisis>

⁸ <http://fairsnape.com/2013/12/04/are-you-running-on-square-wheels>

⁹ <http://fairsnape.com/2013/08/14/sustainability-in-equilibrium-or-peddalling-squares>

¹⁰ Velo, P. F., ISBN 978-0-9568624-1-9, Roulier Ltd, 2012.

¹¹ Evans, R. et al., 'The Long Term Costs of Owning and Using Buildings', Royal Academy of Engineering, 1998.

¹² <http://www.triplepundit.com/2015/09/250-trillion-green-economic-revolution>

¹³ From Bullitt Center Financial Case Study: <http://www.bullittcenter.org/2015/04/02/bullitt-center-financial-case-study/>

¹⁴ Bossom, A. *Building to the Skies: The Romance of the Skyscraper* (1934)

¹⁵ www.fairsnape.com/about

¹⁶ Insights from a Sustainability Leadership Conversation with Denis Hayes <https://fairsnape.com/2014/08/05/restorative-sustainability-once-something-exists-no-one-can-say-its-impossible>

¹⁷ <http://www.iep.utm.edu/heidegge/>

RESTORATIVE THOUGHT LEADERS

We all have heroes and gurus, and that's important. We are all undertaking sustainability approaches and adventures in an attempt to emulate or put into practice the thinking of those we respect. Some actions will be small, everyday and micro, others will be large, macro and industry changing.

ALDO LEOPOLD¹

'Think Like a Mountain.'

Aldo Leopold (1887–1948), a US conservationist, forester, philosopher, educator, writer, ecologist and outdoor enthusiast, best known for Sand County Almanac. Leopold was a hugely significant influence in the development of environmental ethics, particularly between humans and land through his writings on land ethics, of seeing the natural world as a community to which we belong.

YVON CHOUINARD²

'Every time we do the right thing for the environment we make a profit.'

Mountaineer, environmentalist, writer and businessman, founder of Patagonia, considered by many as one of the foremost environmentally focused organisations globally. Patagonia's mission recognises the impact of business and aims to *build the best product, cause no unnecessary harm, use business to inspire and implement solutions to the environmental crisis.*

Chouinard founded 1% for the Planet, a member organisation of leading businesses financially committed to creating a healthy planet, by donating 1% of sales to enabling positive change.

JOHN MUIR³

'When we try to pick out anything by itself, we find it hitched to everything else in the universe.'

John Muir, a Scottish-American naturalist, author, environmental philosopher and early advocate of preservation of wilderness in the United States. His letters,

essays and books telling of his adventures in nature, especially in the Sierra Nevada of California, have been read by millions. Perhaps one of the most quoted environmentalist.

RACHAEL CARSON⁴

'The more clearly we can focus our attention on the wonders and realities of the universe about us, the less taste we shall have for destruction.'

American marine biologist and conservationist, whose book *Silent Spring*, along with her other writings are credited driving forward the global environmental movement from the 1960s.

RAY ANDERSON⁵

'Climbing Mt sustainability'

Writer, businessman and environmentalist, Anderson was founder and chairman of Interface Inc, one of the world's largest manufacturers of carpet. He is recognised as one of the leading business ecologists, whose zero impact legacy remains as a mission for Interface.

PAUL HAWKEN⁶

'The first rule of sustainability is to align with natural forces, or at least not try to defy them.'

Paul Hawken is an environmentalist, entrepreneur and author whose influential writings have shaped corporate sustainability.

GEORGE MONBIOT⁷

'The amplification of our lives by technology grants us a power over the natural world that we can no longer afford to use.'

British writer, environmentalist and political activist, a regular contributor to *The Guardian*, and author of a number of books, including *Feral: Searching for Enchantment on the Frontiers of Rewilding* (2013).

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SUSTAINABILITY ROCKS PLAYLIST – TRACKS THAT INSPIRED SUSTAINABILITY THINKING

‘If houses were trees ... If buildings could smile ...’

LUCINDA WILLIAMS

While the tracks in this playlist⁸ may not have been written or intended as environmental pieces, the feel of the track – or even just a line – triggers the imagination and resonated with the author’s thinking behind FutuREstorative.

If I Could be Anywhere – Jackson Browne

Here Comes the Flood – Peter Gabriel

Holy Ground – Steve Winwood

No More Walks in the Wood – The Eagles

What If – Lucinda Williams

Urge for Going – Joni Mitchell

Our Earth Was Once Green – Runrig

Big Yellow Taxi – Joni Mitchell

Where do the Children Play? – Cat Stevens

Here Comes the Sun – George Harrison

Spring / Birth – Maddy Prior

Jackson Browne, a stalwart of protest, sings in *If I Could be Anywhere* of there being no better place to be than today to change the outcome of the planet, in a Gaia-influenced track that predicts the earth will rid itself of our greed.

Many of the tracks listed here protest against damage to the environment, from Joni Mitchell’s seminal *Big Yellow Taxi*, to The Eagles’ *No More Walk in the Woods*, inspired by Thoreau’s Walden Woods. Cat Stevens back in the 1970s asked, as we sadly still do, ‘*Where do the children play*’ as we ‘*build over grassland and countryside, as skyscrapers crack the skies*’, foretelling of the Internet of Things perhaps with ‘*switch on summer from a slot machine*’.

Lucinda Williams’ *What If* imagines buildings that smile, conjuring images of happy living buildings, yet ‘*windows that could cry*’ conjures images of our unsustainable existing buildings and many of those we sadly still build today. Another Joni Mitchell track included here, *Urge for Going*, has a feel of connectivity with nature, having an urge for flying south when the grass turns brown. But it’s not all doom and gloom. George Harrison’s *Here Comes the Sun* and Maddy Prior’s *Spring* paint a picture of hope, of rebirth and a new living future.