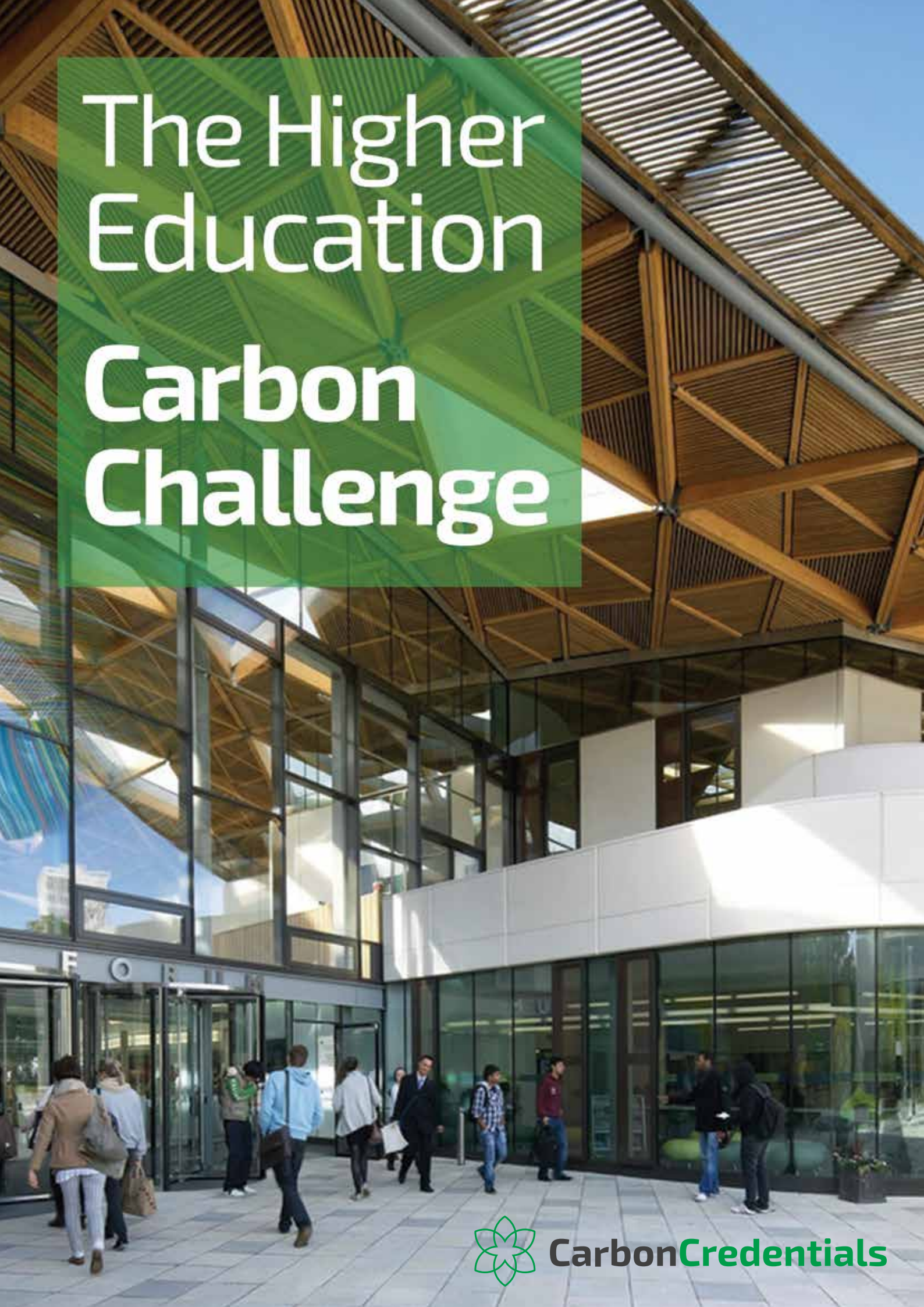
# The Higher Education Carbon Challenge



CarbonCredentials

I feel privileged to have worked in collaboration with a wonderful range of HEIs over the last decade, and it is clear to me that universities across the UK have made huge strides forward in improving their carbon and sustainability credentials.

I am frequently reminded of the quality, passion and persistence of practitioners in this space, and enjoy the collaborative and open nature of the HEI sector. However, the HEI landscape, pressures and opportunities are changing, and changing fast. We as sustainability professionals need to adapt equally as fast in order to ensure sustainability stays on the agenda of the Vice Chancellors and their management teams.

Five years on from HEFCE's launch of the Carbon Reduction Target and Strategy for Higher Education in England, and following the publication of similar requirements for institutions in Scotland, Wales and Northern Ireland, this report gives an inside view on the carbon challenge we as a sector are facing. It seeks to further thinking on the best route forward by exploring the progress made to date and sharing practical insights from a number of proactive HEIs.

With our findings indicating that a further carbon reduction of 38% is required to meet the 2020 sector target, clearly the scale of the challenge ahead is significant. However, given that our analysis suggests institutions can meet this target by investing 1% of their annual income in carbon management programmes, and generate significantly more than this in financial and strategic returns, I am confident that the sector can meet its 2020 target.

I am proud of the role that Carbon Credentials is playing in supporting this journey. We, like other organisations, such as the EAUC, are committed to supporting HEIs across the UK to ensure carbon and sustainability can become a strategic enabler for prosperity and success.

Please use this document as a guide, a tool and a motivator to help you make the right next move towards your 2020 objectives. I look forward to our continued work with Universities across the country as we enter this exciting new academic year.

**Paul Lewis**
Chief Operating Officer, Carbon Credentials

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This report is a valuable contribution to the sector's understanding of its performance. There is a clear disconnect between our carbon reduction targets and the rush to grow student numbers. While an absolute reduction is the only show in town, carbon intensity metrics open up new avenues to understand and improve our carbon performance.

With a near collapse of carbon reduction policy drivers and funding coming from Government agencies, the UK HE sector stands at a cross-roads.

Increasingly, graduates seek employers who meet their accountability and responsibility expectations. With the marketisation of an ever more competitive sector, universities have to up their carbon game to attract students. This report shows that it is possible.

The view of the EAUC is that it's time to look again at investing in carbon management. By aggregating projects, new finance mechanisms such as Energy Performance Contracting become increasingly attractive.

The EAUC will continue to support universities and colleges take a leadership role across all aspects of sustainability, and with respect to carbon management we will ensure their voice is heard at the forthcoming UN Climate Change COP21 talks as we lobby for more effective climate change policy.

**Iain Patton**
Chief Executive, EAUC

eauc

# INTRODUCTION

Over the last decade, the higher education sector has demonstrated a strong commitment to sustainable development, aligning with global efforts to combat climate change by reducing emissions of carbon dioxide and other greenhouse gases.

Uniquely positioned, the higher education sector has the ability and resources to make significant contributions to the global climate change effort.

In 2010, HEFCE, Universities UK and Guild HE published a carbon reduction target and strategy for higher education in England, which set a collective and ambitious 43% carbon reduction target by 2020, against a 2005 baseline. This target is aligned with the 2008 Climate Change Act and confirms the contribution that the sector will make to the UK's carbon reduction efforts. Similar requirements are in place for institutions in Scotland, Wales and Northern Ireland through their respective funding councils and devolved governmental Departments.

Whilst some institutions have reported significant absolute reductions in scope 1 and 2 emissions, others have struggled due to estate expansion, and growing numbers of students and research programmes.

Carbon Credentials has applied its expertise and experience in the higher education sector, and continues to enjoy its collaborative work with a wide range of universities. While the 2020 sector target is clearly a challenge, Carbon Credentials is confident that the talent, ambition and potential for savings that is evident in the sector will give it the best possible chance of success.

There has never been a better time to define your carbon reduction strategy to 2020.

## Drivers for Effective Carbon Management

- Attracting students
- Enhancing reputation
- Contributing to global efforts to combat climate change
- Complying with legislation
- Delivering the carbon strategies of UK HE funding councils
- Cost savings
- Developing world-class teaching and research facilities
- Building local, national and global partnerships

# TREND IN CARBON EMISSIONS

Carbon Credentials has evaluated the sector's carbon performance by analysing scope 1 and 2 carbon emissions for 120 institutions from across the UK. This sample size is purely based on data availability, and the trend was compared to the 43% reduction target that was set by HEFCE. While this target only applies to English universities, it is derived from the UK's Climate Change Act and is therefore a meaningful objective that all UK universities can be assessed against.

This analysis confirms that the sector has reduced carbon emissions by 9% since 2005/06. To meet the 2020 target a further reduction of 38% must be achieved.

**In other words, over QUADRUPLE the amount of carbon reduction progress needs to be made in HALF the time.**

| Year | 2005/06 | 2008/09 | 2013/14 | Percentage Change |
|---|---|---|---|---|
| Scope 1 & 2 Carbon Emissions ($tCO_2$) | 2,039,373 | 2,075,409 | 1,866,894 | ↓ 9% |
| Income | Data unavailable | £20,791,723,000 | £25,271,327,000 | ↑ 22% |
| Gross Internal Area ($m^2$) | | 20,685,595 | 21,246,950 | ↑ 3% |
| Full Time Equivalent Staff & Students | | 1,575,609 | 1,620,657 | ↑ 3% |
| FTE Staff | | 247,732 | 261,320 | ↑ 6% |
| FTE Students | | 1,327,877 | 1,359,337 | ↑ 2% |

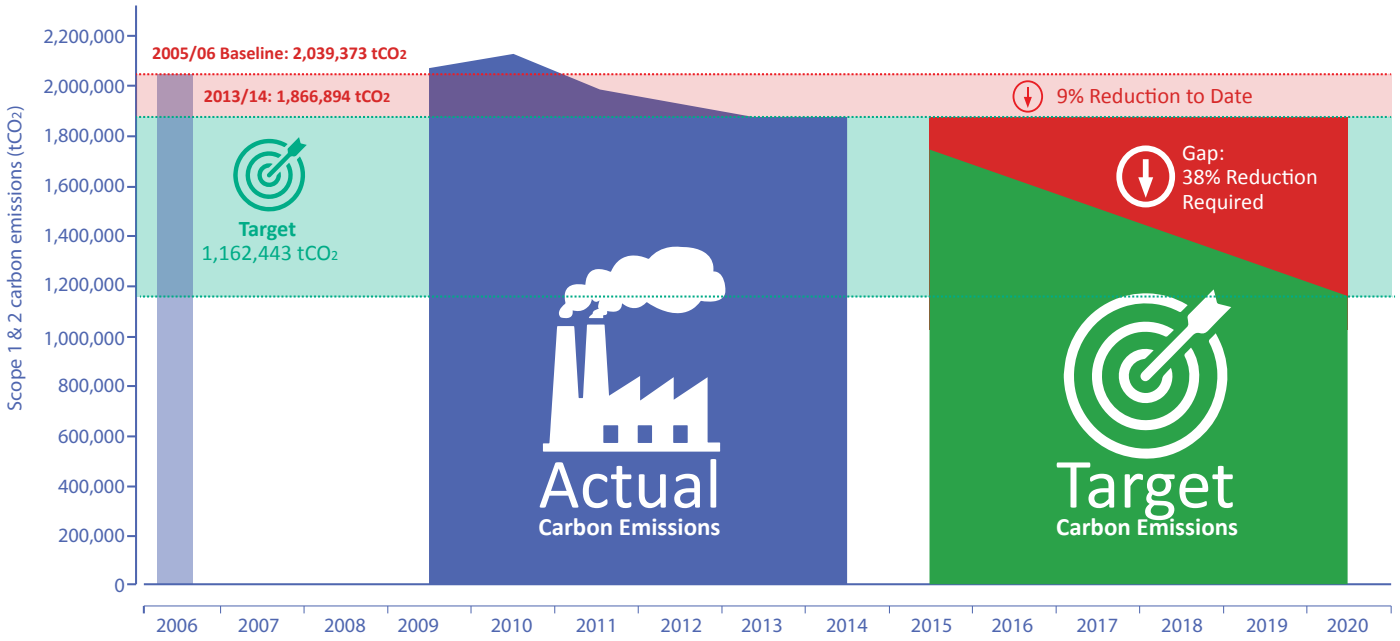
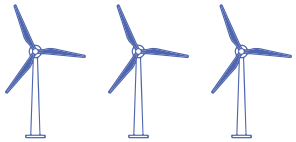



*Figure 1. The sector's scope 1 & 2 carbon emissions ($tCO_2$) since 2005/06, highlighting the gap to the 2020 target. Please note: analysis is based on 120 institutions where data is available for all years (2005/6, 2009-2014), all data comes from the Higher Education Statistics Agency*

**This gap of 38% or 704,451 $tCO_2$ is equivalent to:**

**Annual carbon emissions from 270,000 petrol cars**



**Annual carbon saving from 275 2MW wind turbines**

# CARBON PERFORMANCE OF UK HIGHER EDUCATION INSTITUTIONS

The current distribution of individual institutions' scope 1 and 2 carbon emissions relative to the 2020 target and 2005/06 baseline is portrayed in Figure 2.

The chart breaks down institutions into 3 groups:

**Institutions that have increased scope 1 & 2 carbon emissions**

**Institutions that have decreased, but not met the sector target of 43%**

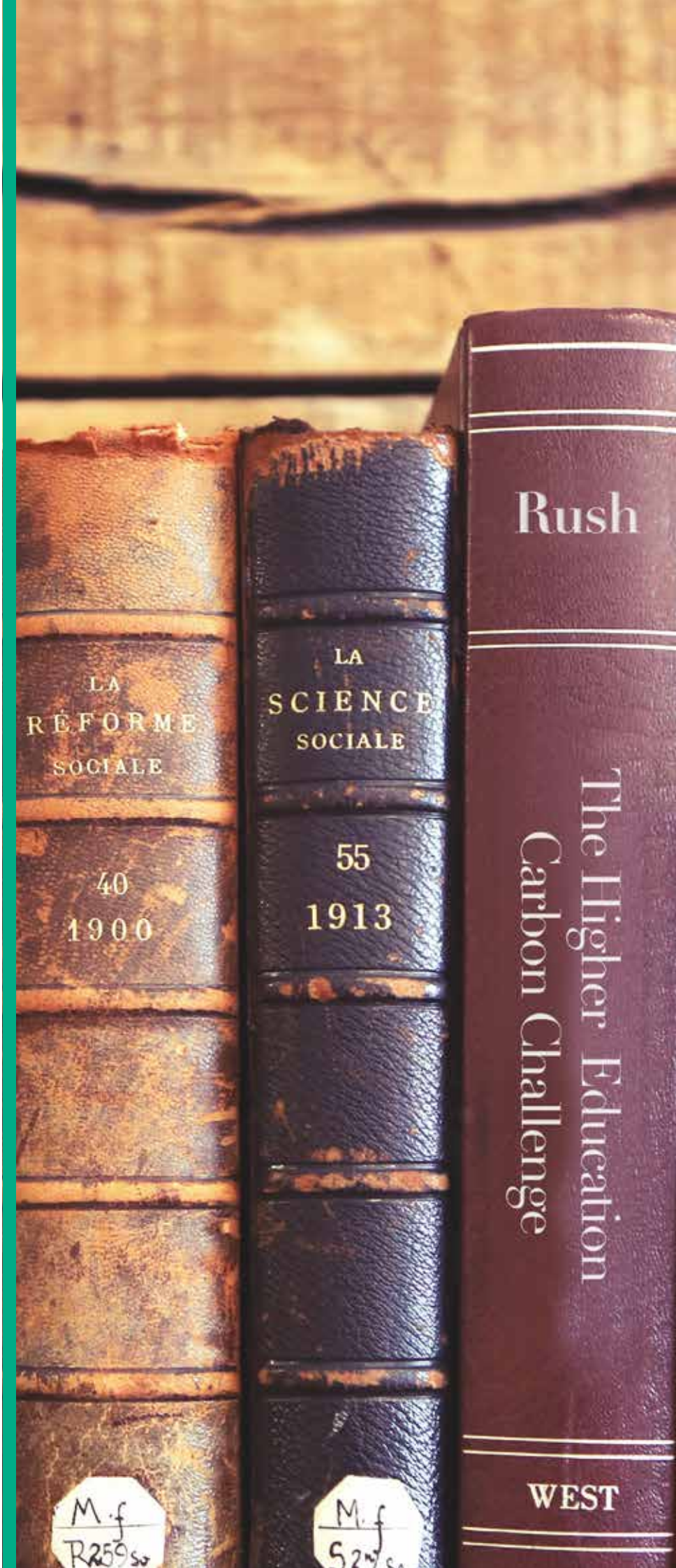
**Institutions that have achieved the sector target of a 43% reduction**

While the majority of institutions have reduced their scope 1 and 2 emissions, just 4% of universities have met the sector target.

Interestingly, the institutions that have increased their emissions since 2005/06 account for a higher proportion of total carbon emissions, with this group representing 34% of universities and contributing 44% of total emissions.

This analysis suggests that there is a higher proportion of larger universities in the red zone, arguably with more potential for greater absolute carbon reductions.

The vast disparity in progress stresses that the challenges, opportunities and required actions will be unique for each institution. It also emphasises the need to use intensity metrics to contextualise carbon emission figures and gain a more complete understanding of performance.



| Category | Number of Institutions | Percentage of Total Institutions | 2013/14 Scope 1 & 2 Emissions | Proportion of Total 2013/14 Scope 1 & 2 Emissions |
|---|---|---|---|---|
| Increased | 41 | 34% | 831,637 | 44% |
| Decreased | 73 | 61% | 981,439 | 53% |
| Decreased & achieved target | 6 | 4% | 53,818 | 3% |
| Total | 120 | 100% | 1,866,894 | 100% |

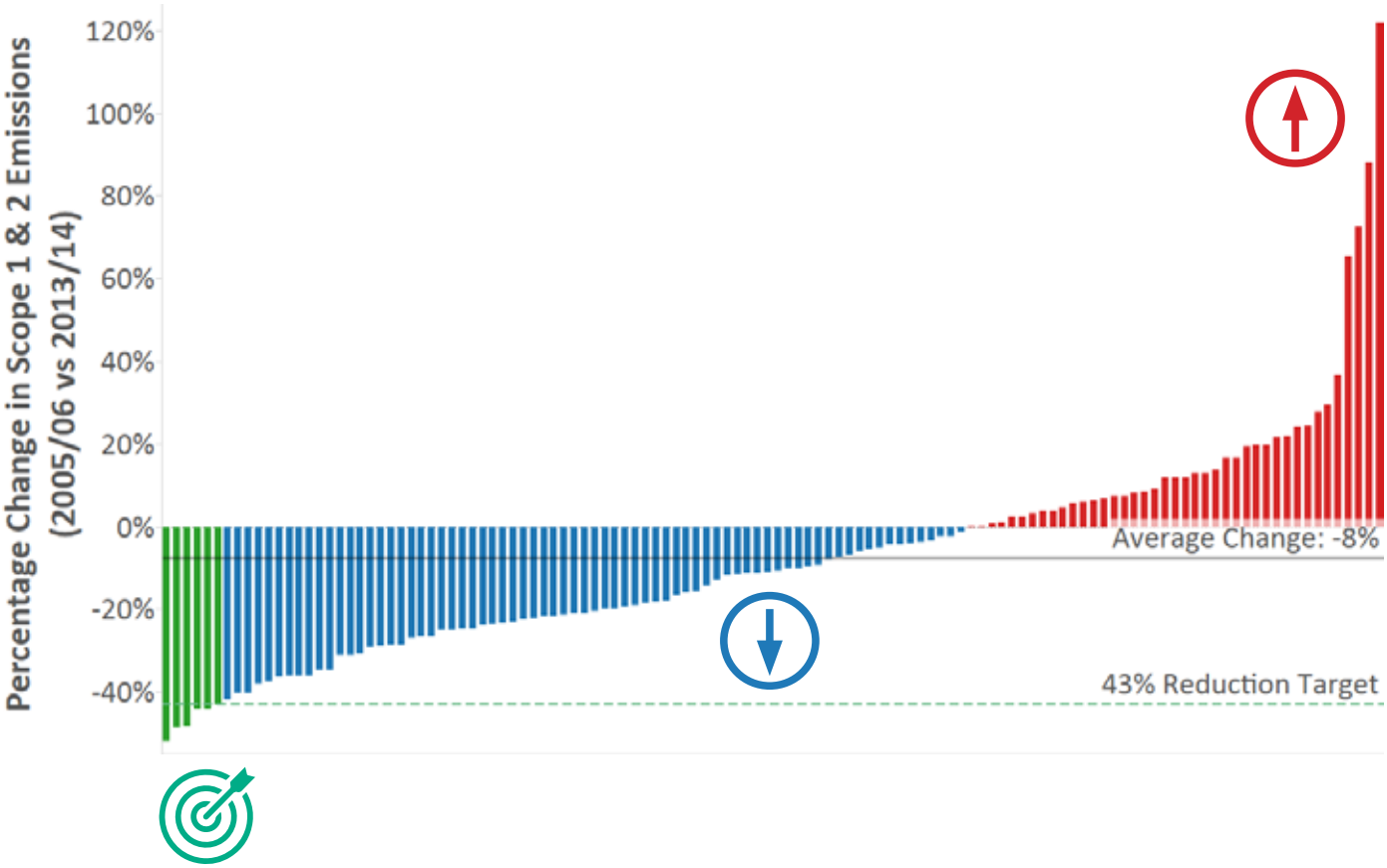



*Figure 2. Relative change in scope 1 & 2 carbon emissions for all 120 institutions' included in our analysis (2005/06 – 2013/14)*

# USING INTENSITY METRICS TO BUILD A MORE COMPLETE PICTURE OF CARBON PERFORMANCE

While it is important that higher education institutions fulfil their climate change obligations and reduce carbon emissions on an absolute basis, it is vital to understand the challenges this poses in a dynamic and increasingly competitive sector.

Figure 3 charts the institutions presented in Figure 2 by 2013/14 carbon emissions intensity ($kgCO_2/m^2$), with the same colour coding. Using this metric, 4 of the 10 most efficient institutions have increased their carbon emissions on an absolute basis since 2005/06.

This analysis shows that growth in absolute carbon emissions is not a good indicator of carbon efficiency, and does not mean an institution is unsustainable or failing to make positive improvements. Clearly, institutions with historically small carbon emissions have struggled to achieve absolute reductions, and by pursuing this objective they risk competition and conflict with demands for growth in student numbers and revenue.

Conversely, historically carbon inefficient institutions with more opportunity to reduce their carbon emissions are rewarded for marginal improvements and can easily demonstrate an effective approach to carbon management.

Does this mean that the larger, less efficient universities should surpass sector targets as they have more opportunity for change?

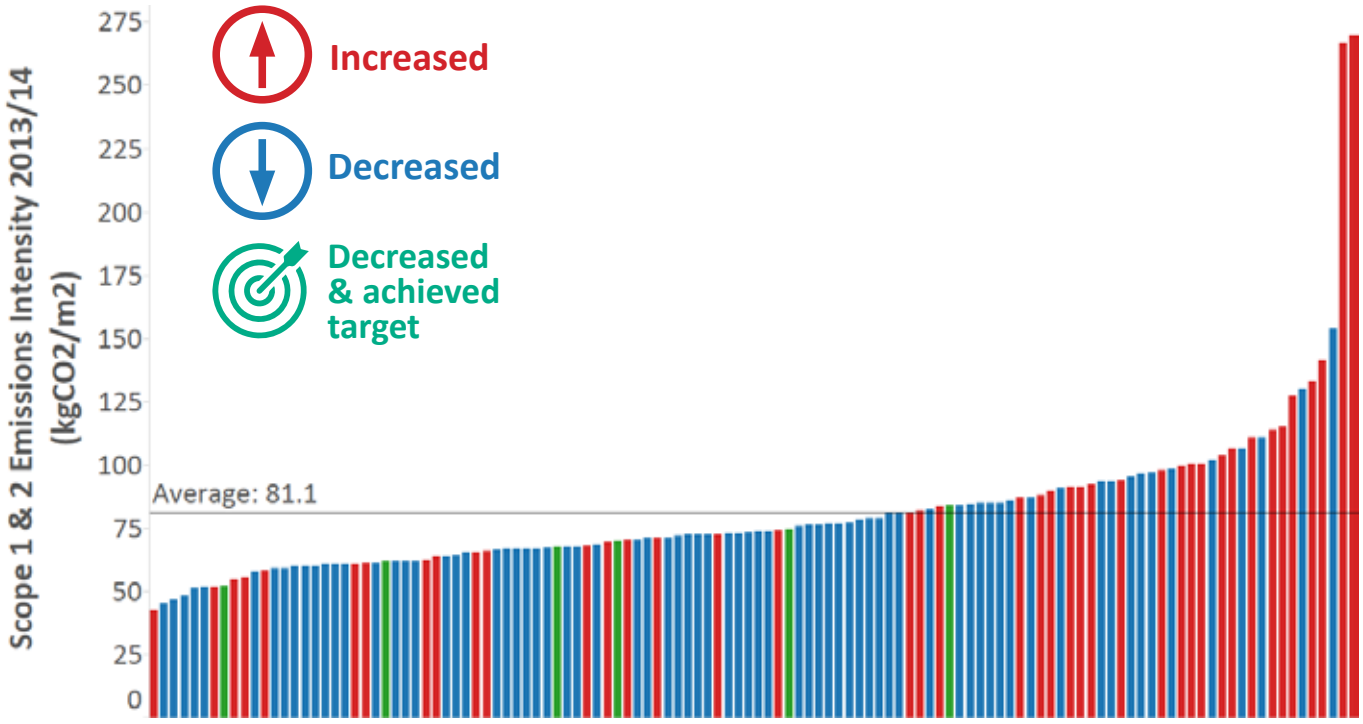



*Figure 3. Emissions Intensity ($kgCO_2/m^2$) 2014 colour coded by section (increased, decreased & hit target)*

# WHAT ARE YOUR MOST IMPORTANT CARBON MANAGEMENT CHALLENGES?

In order to better understand the challenges that universities are facing, Carbon Credentials conducted a survey with the attendees of the 2015 EAUC Annual Conference, held at the University of Leeds.

Sustainability professionals from 91 UK universities were asked to pick their top 3 challenges, with 'engagement' and 'funding' identified the most regularly by respondents. If the sector is to achieve 2020 carbon reduction targets, collective action is required to develop solutions to these challenges.

While these survey results identify overarching challenges, approaches to carbon management must respond to institution-specific drivers and align with other strategic objectives in order to meet individual reduction targets and contribute appropriately to the 43% sector target.

The case studies presented over the next four pages showcase how a range of universities have tackled these pertinent challenges.

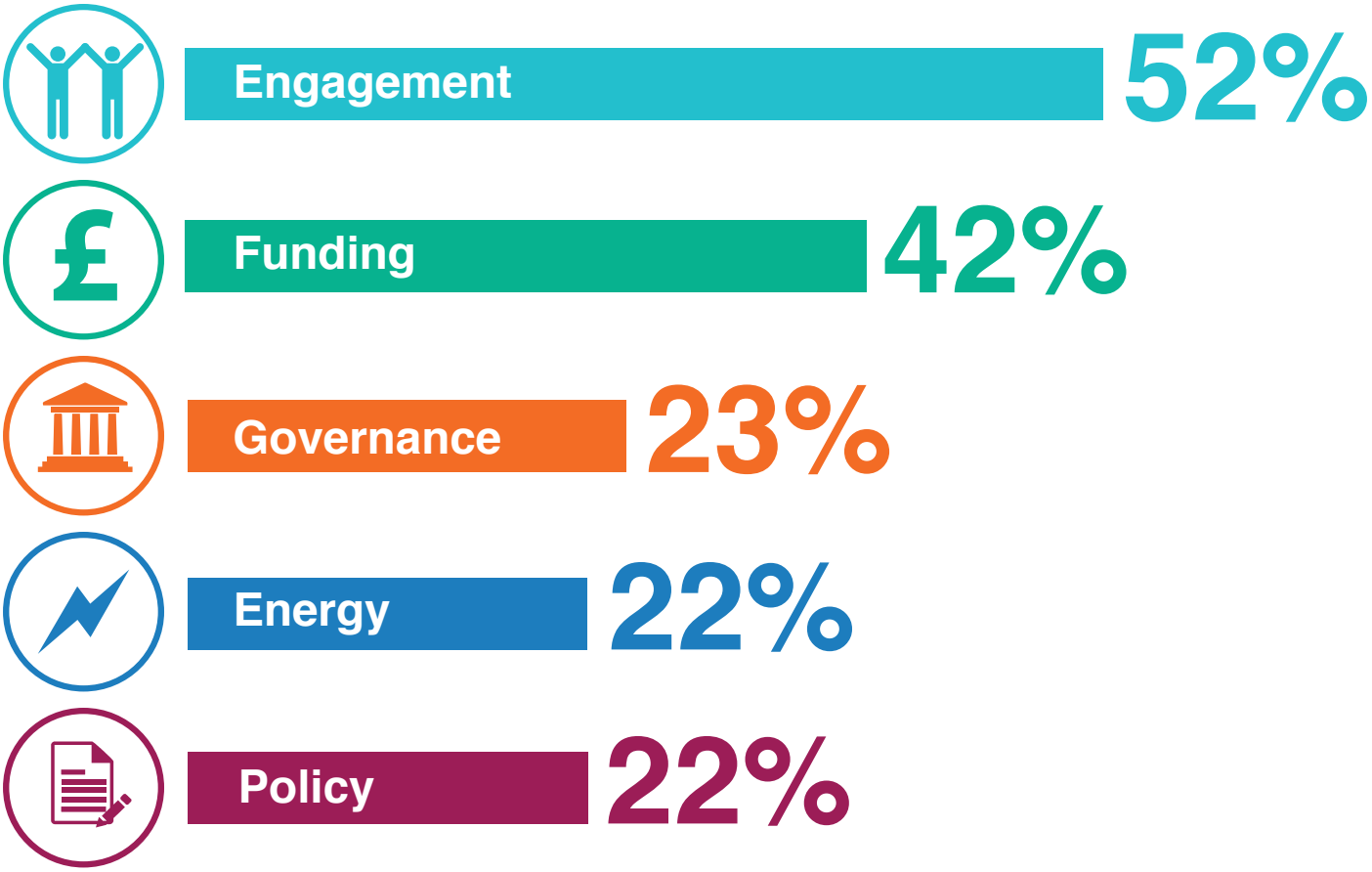
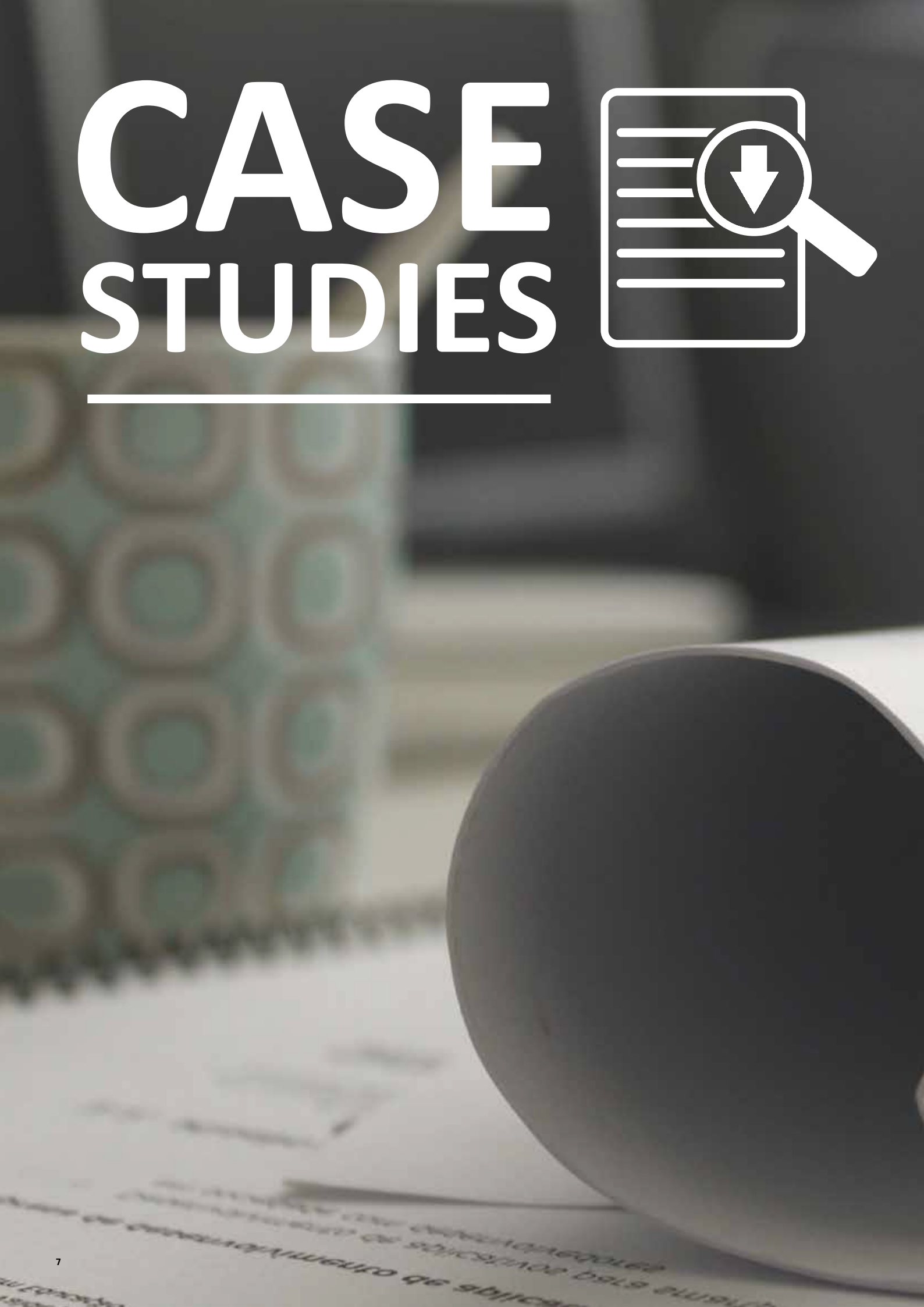



*Figure 4. Carbon Credentials' survey results from 2015 EAUC Annual Conference, the percentages relate to the proportion of respondents who selected that category as a challenge.*

# CASE STUDIES




Engagement
Funding
Governance
Energy
Policy

# UNIVERSITY OF NOTTINGHAM

Building the financial strategy to deliver long term carbon targets

## Background

The University of Nottingham is a world leader in sustainable development and has been recognised for its activities in this area by winning numerous awards. Like many other higher education institutions, it is expanding to accommodate world leading research and the increasing student demand for quality learning environments. This growth leads to higher energy consumption and emphasises the importance of effective carbon management.

A limited team capacity combined with a desire to refresh its Carbon Management Plan (CMP) saw the University of Nottingham commission Carbon Credentials to develop a better understanding of the opportunities and risks in delivering a successful CMP for 2020 and beyond.

## Solution

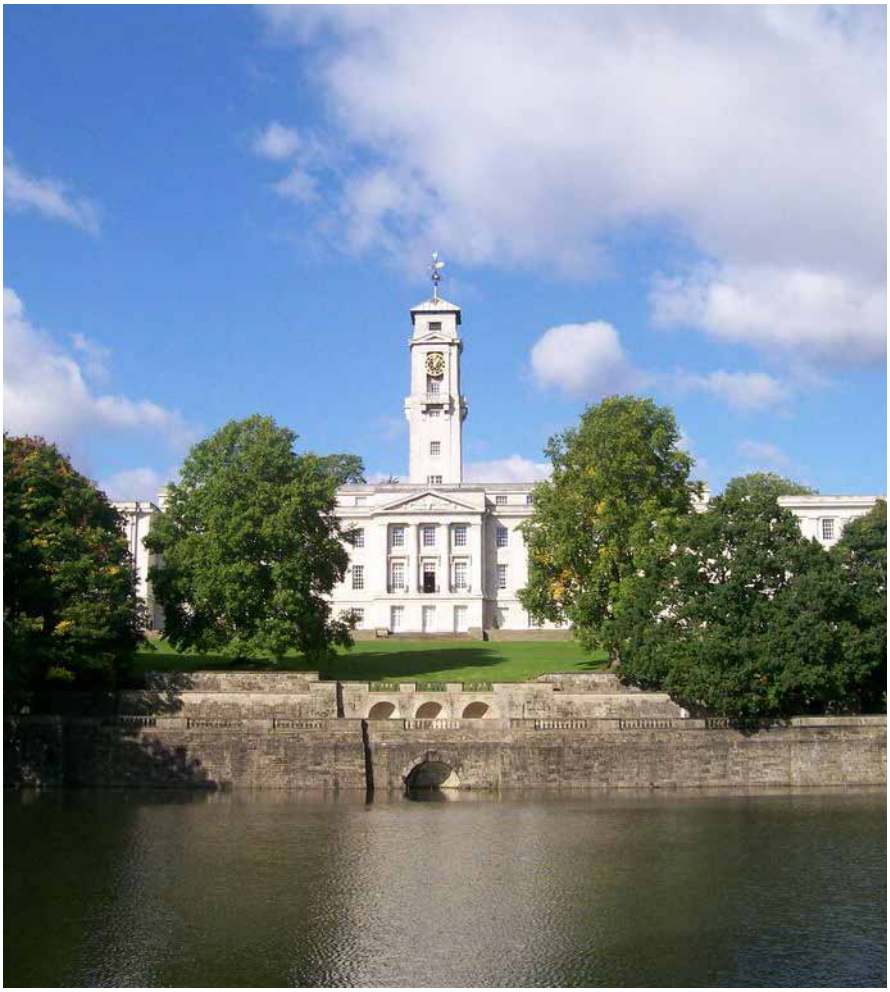
### Phase 1: Carbon Management Plan Diagnostic

Carbon Credentials used a desk-based analysis of data, consultations and a workshop with internal stakeholders to gain a deep-level understanding of the current situation. The CMP Diagnostic highlighted a number of areas that are vital for successful CMP implementation, with the most immediate being the confirmation of the emissions scope of the CMP and the development of a CMP Financial Strategy.

### Phase 2: Building the Carbon Management Plan

Following the results of the CMP Diagnostic, the University of Nottingham commissioned two work streams to assist the University refresh its CMP:

- **GHG Discovery: Identifying which Scope 3 emissions should be included in the CMP**
- **CMP Financial Strategy: Identifying the carbon saving measures required to achieve the targets, establishing the business case, and exploring the technology market and funding options available**



## Outcome

*"Working with Carbon Credentials provided us with an invaluable detailed 3rd party review of our current approaches, enabling us to gain a clearer understanding of opportunities, but also the risks we were exposed to by not taking further action.*

*These included:*

- ***Previous CMP solely focused on Scope 1 & 2 emissions***
- ***Enabling us to make carbon management efforts more accessible for all stakeholders***
- ***Effective stakeholder engagement and communications has enabled the University of Nottingham to drive a change in management practice and culture***

*We were able to access their high quality, data-led technical, financial and industry experience in order to create the ideal roadmap for developing the pipeline of projects we need to deliver our long term carbon targets. The strategic work that Carbon Credentials has done will enable us to quickly and efficiently move forward into the delivery of carbon reduction projects. I would wholeheartedly recommended Carbon Credentials to any organisation looking to deliver ambitious carbon saving objectives."*

**Andy Nolan**
Director of Sustainability

# BATH SPA UNIVERSITY

Delivering carbon reductions through an Energy Performance Contract

## Background

Bath Spa University has procured an Energy Performance Contract (EPC) to upgrade its university portfolio, deliver energy and carbon savings, and achieve carbon targets. Bath Spa undertook an OJEU-compliant, competitive tender process, and engaged with Schneider Electric (Schneider) to complete the Investment Grade Audit (IGA).

Bath Spa approached Carbon Credentials to provide an independent review of the proposed Measurement and Verification (M&V) process. Schneider's EPC is targeted to save 1,000 tonnes of carbon emissions per year with a 10 year payback, and it was important to the University that they could be confident in the annual savings created.

## Solution

### M&V Planning Support

Carbon Credentials reviewed the proposed M&V sections of the EPC and the guarantee-phase elements of the contract. Bath Spa University sought to reduce risks within the contract through the development of a robust and effective M&V plan. By evaluating the relevant sections of the contract that covered the planning and on-going calculation of savings created by the EPC, Carbon Credentials was able to identify areas of concern and provide solutions on how to reduce risks in these areas.

## Outcome

*"I'm very pleased with the way the support from Carbon Credentials has worked, with the clarity it has brought, the advice given and with the professionalism of the team, in what could have been a divisive situation. By bringing trusted third party input into the M&V Plan development I can be confident that the final output creates optimum benefit for the University."*

**Dr Julian Greaves**
Sustainability Manager

# UNIVERSITY OF EXETER

Using the Carbon Management Plan to engage stakeholders

## Background

The University of Exeter provides world-class research to address the challenges of climate change, working closely with the Met Office at the Hadley Centre. Despite a 66% growth in student numbers, by 2014 the university had achieved an 11% reduction in Scope 1 and 2 carbon emissions against its 2005 baseline.

Carbon Credentials carried out a diagnostic process which highlighted a lack of awareness amongst staff and students of the steps the university was taking to reduce carbon emissions, as well as a need to agree on the measures and investment levels that would deliver its carbon reduction targets.

## Solution

Following the diagnostic exercise, Carbon Credentials was instructed to support the carbon management development process.

Carbon Credentials worked collaboratively with key members of the sustainability team at the University of Exeter to design an optimal approach to carbon management, confirm the technologies that will be pursued and the role that staff and students can play, and communicate this strategy to stakeholders.

## Outcome

*"Through this process, the University of Exeter's Low Carbon Commitment was born. Carbon Credentials produced a document that outlines how a unified effort from staff and students will enable carbon management to be embedded throughout the organisation.*

*The Low Carbon Commitment confirms an ongoing pledge to deliver a world-class university by improving facilities in an environmentally responsible manner and empowering staff and students to take action."*

**Andy Seaman**
Energy Manager

# BIRKBECK, UNIVERSITY OF LONDON

Data-driven carbon performance

## Background

Birkbeck instructed Carbon Credentials to review and update the current Carbon Management Plan (CMP) to define a feasible route to meet 2020 carbon reduction targets.

A number of issues with the old CMP were identified:

- Misalignment between carbon objectives and other strategic goals
- No clear pathway to achieving carbon reduction targets, and insufficient understanding of required investment
- CMP documentation was not engaging and did not reflect the quality of online sustainability communications
- Lack of data management technologies and processes required to effectively monitor progress

## Solution

During the CMP build process, Carbon Credentials defined data management requirements to ensure CMP implementation was integrated with a robust data management plan. Requirements included the ability to monitor and measure the impact of individual projects effectively, and provide stakeholders with instant access to Birkbeck's carbon performance.

Carbon Credentials implemented an online carbon and energy management portal that collated data for energy, water and waste. A reporting framework developed in collaboration with Birkbeck defines how carbon performance will be communicated to engage stakeholders and drive the programme.

## Outcome

A revitalised CMP was implemented that aligned with Birkbeck's strategic plans, confirmed investment levels, and documentation was designed in a manner that showcases Birkbeck's approach to sustainability and engages staff and students. By managing Birkbeck's data management and reporting programme, Carbon Credentials is able to support the management of carbon impacts and communicate performance to those that can affect change.

*"With 2020 targets looming on the horizon Birkbeck's current rate of carbon reduction was predicted to fall short, despite making reductions to date. Acting on this need to revitalise our CMP and a shared understanding of the risks and opportunities, we sought assistance from Carbon Credentials to help focus our efforts.*

*Carbon Credentials addressed our previous lack of data management technologies and processes, which now allows us to monitor our progress properly. I think Carbon Credentials' understanding of the importance of communication and people within the process of change is the key to ensuring their software and technical solutions continue to be effective."*

**Ola Bankole,**
Environmental Manager

# THE COMPONENTS OF AN EFFECTIVE CARBON MANAGEMENT PROGRAMME

Through previous and ongoing work with a range of universities, each in uniquely challenging situations, Carbon Credentials has accumulated a wealth of experience and developed specific expertise to fast track Institutions to low carbon delivery. The diagram below consists of the components identified as critical through experience and illustrates how they work together to produce a tailored approach to carbon management.

### Stakeholder Engagement

By engaging with key stakeholders during the design process, a tailored carbon management programme that is aligned to the strategic direction of your institution will be developed. Equally, the carbon management programme needs to define the role different stakeholder groups can play and outline a strategy for their involvement.

### Engineering & Capital Projects

The CMP must be implementable, fundable and extract maximum carbon savings. Our experience has led us to understand the importance of delivering this programme from an investment and technical perspective, providing a detailed action plan that leads to carbon savings.

### Funding

Build a robust funding plan, aggregate projects to build a sizable funding opportunity and engage with financial decision-makers from the outset, to ensure the best possible chance of securing sufficient investment to meet your carbon target.

### Communications

Effective communication of performance to relevant stakeholders is vital. Using verified data structured in robust data systems, best practice greenhouse gas reporting methodologies and strong visual design, carbon performance can be presented in a transparent, accurate and engaging way.

### Data Management & Analytics

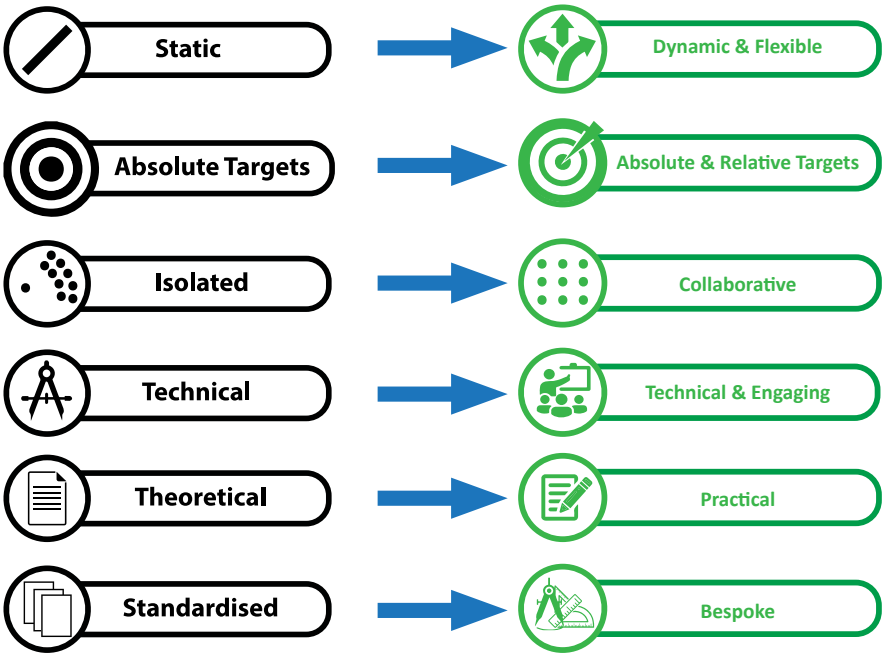
A high quality carbon management programme must demonstrate a robust data system to support the management of all carbon impacts, enable ongoing analytics and reporting, as well as having the capability to measure and verify achieved energy savings.

# HOW TO DEVELOP AN EFFECTIVE CARBON MANAGEMENT PROGRAMME AND ENSURE CONTINUAL IMPROVEMENT

A bespoke carbon management programme needs to be developed in the context of your organisation's wider operations and needs to reflect your institution's specific needs, drivers and values.

The complex nature of carbon management requires programmes to be both dynamic and flexible so that they are better suited to respond to change.

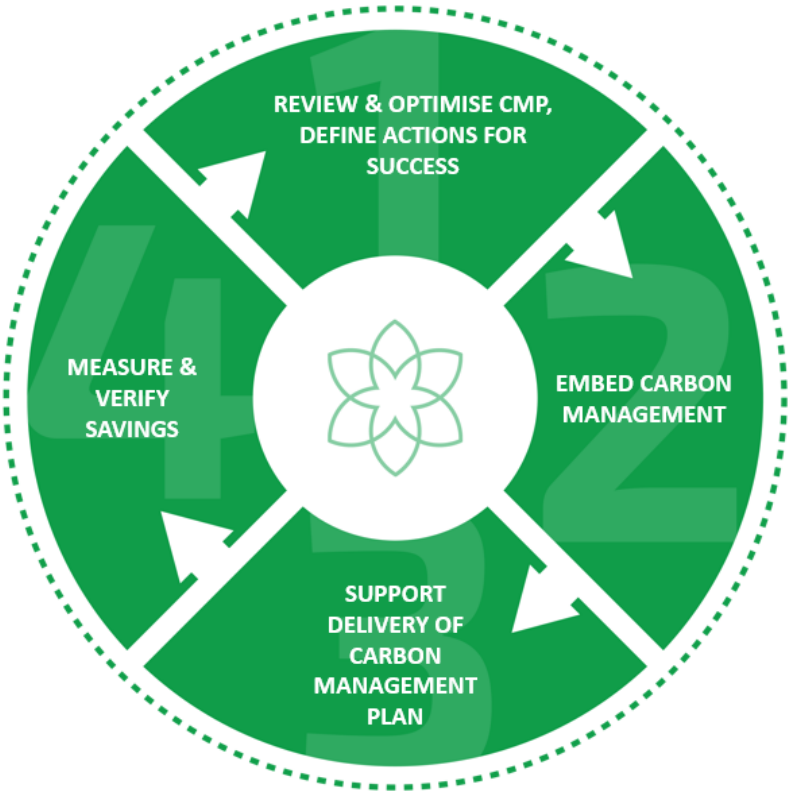
When developing your carbon management programme it is important that you learn from past failures. Carbon Credentials has summarised the trends in carbon management below, highlighting the necessary characteristics for a successful plan.




Carbon Credentials has successfully applied its four-stage approach to carbon management across the public and private sectors.

The approach focuses on continual improvement, and emphasises the importance of defining the actions that will fully embed optimised carbon performance across an organisation. This four-stage approach must be refined to suit an organisation, and only with careful consideration of current practices, opportunities and risks can a programme be fully optimised.

To implement a carbon management programme that is aligned with the wider context of your institution, it is imperative that you bring in stakeholders to understand their challenges and objectives. A collaborative diagnostic exercise will help you to embark on this process with a clear understanding of the risks and opportunities associated with your current approach, helping to focus improvement efforts on the sub-optimal aspects and ensuring that key stakeholders are brought into your proposals for development.



# ACHIEVING THE 2020 CARBON REDUCTION TARGET

Based on our analysis of HESA data, the sector has committed to delivering a further 38% reduction in scope 1 and 2 carbon emissions by 2020. Compared with the 9% reduction achieved to date, the scale of reductions required are significant, and present a real challenge for the sector.

Our view, which is shared by respondents to our recent survey, is that this challenge is predominantly a financial and engagement issue. A wide range of stakeholders need to be actively engaged in carbon management at their institutions, and senior leadership teams must provide the resources and funding required to optimise the energy performance of buildings and increase renewable and low-carbon energy generation capacity.

In order to better understand the scale of investment required to meet 2020 targets and encourage debate on this challenge, Carbon Credentials has evaluated the financial and carbon returns provided by a realistic blend of technologies for the 120 institutions analysed in this publication.

Based on this assessment, it is estimated that the sector must invest around £900 million in carbon reduction measures between now and 2020 to meet the sector target of 43%. This represents 3.6% of total income for 2013/14, suggesting that institutions should aim to invest 1% of their income each year between now and 2020 to contribute appropriately.

While this assessment does not account for increased energy demand as institutions grow, it is our view that this level of investment is achievable and will provide strong financial returns to the sector.

The sector has a significant opportunity to demonstrate leadership by meeting its commitments on climate change. Ultimately the responsibility for delivering sector and institution level targets lies with individual institutions and achievements will be determined by their responses. The most successful institutions will undoubtedly be those that embed sustainability considerations at the heart of their decision making and make carbon management objectives aligned with, and core to, their strategic plans.

**£900,000,000**
Estimated investment required to achieve 2020 sector targets

**3.6%**
Required investment as a proportion of 2013/14 income

**1% of annual income**
Suggested budget for carbon management programmes

# Our Carbon Management Team

**Paul Lewis**
Chief Operating Officer

As well as driving the operational success of the business, Paul leads our key energy services projects. Paul has developed carbon and energy strategies for numerous Higher Education Institutions in the UK and across Europe.

**Will Jenkins**
Consultant

Will utilises his expertise in engagement and behaviour change when working with higher education institutions to help them design and embed practical carbon and energy strategies.

**John Taylor**
Associate Director, Energy Performance

John, a Chartered Building Services Engineer, has over a decade of experience in energy auditing, carbon management planning, renewable energy strategies and building services.

**Scarlett Benson**
Consultant

Scarlett delivers our greenhouse gas emissions reporting and verification services, helping higher education institutions to improve the accuracy and transparency of carbon disclosure.

**Ben Hart**
Senior Energy Performance Consultant

Ben, a Charted Energy Manager, leads on our capital projects services and helps Higher Education Institutions develop funding strategies that will achieve their carbon reduction targets.

**Emma Watson**
Analyst

Emma plays a key role in the delivery of our data, analytics and reporting services, helping higher education institutions to report accurately on their carbon performance.

Thanks to our contributors: Andy Nolan, Andy Seaman, Iain Patton, Julian Greaves & Ola Bankole

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