Corporate Sustainability
Lessons Learned
Acting on carbon:
Our 10 year journey
Introduction

Our Lessons Learned publications are designed to share our experience of implementing our sustainability strategy, in order to allow others to learn from our successes – and our mistakes.

Addressing our climate impact is central to our sustainability agenda and is the main focus of our environmental actions. It’s also in line with the Sustainable Development Goals (SDGs), especially Goal 7, Affordable and Clean Energy and Goal 13, Climate Action\(^1\).

We set our first carbon emissions targets back in 2007 and have since reduced the greenhouse gases associated with our energy by 77% in absolute terms. Moreover, we've reduced our overall carbon footprint, including emissions associated with our travel, waste and materials, by just under 30% - whilst growing our business by almost a half. This report tells the story of how we’ve achieved this.

Further information on our environmental initiatives can be found at www.pwc.co.uk/corporatesustainability and details of our contribution to all the SDGs is available to view at www.pwc.co.uk/sdg.

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1. See page 7 of this document for more details
Executive Summary

The impacts of climate change are being felt across the globe, from extreme weather to changes in land fertility, with widespread social consequences. Greenhouse gases are acknowledged as a key contributor, so we wanted to do our bit by addressing our own carbon emissions – our stakeholders expected it of us and it made economic sense for us, too.

By rethinking how we ran and occupied our offices, we’ve cut the carbon footprint associated with our energy consumption in our buildings by 77%, saving us £20 million in direct energy costs over ten years. Combined with our programmes to reduce the negative impacts of business travel and waste, we’ve reduced our total absolute carbon emissions by 29% (exceeding our 25% target), whilst almost doubling the size of the business.

At the start of our ten-year journey, our focus was on carbon emissions from our buildings. This was in line with the market expectations at the time and they formed the majority of our carbon footprint. We adopted four complementary approaches, outlined below: operating differently; consolidating our office space into fewer properties; refreshing our real estate to adopt sustainable designs; and investing in new technology. Together, these mean our energy consumption is today 50% lower than in 2007.

Operating differently. Through relatively simple initiatives, like turning lights off out of hours, not heating our buildings excessively and switching to renewable electricity contracts, we were able to make significant improvements as part of ‘business-as-usual’. In some cases, we had to adopt creative solutions to realise these benefits – like aligning the working hours of our cleaning and maintenance staff to those of our own people – but these reductions were achievable with little to no upfront cost.

Consolidating our office space. Over ten years, we’ve streamlined our offices from 43 to 30 whilst accommodating 2,200 people more than the c.19,000 we had in 2007. We’ve managed this by changing the way our people use the space in our offices, moving to ‘hotelling’ (where people book a desk only for the hours they will be using it), and by flexing the space to suit different needs, such as restaurant areas and partner offices that can double up as meeting rooms. This has all been enabled by a move to more collaborative and informal working spaces and a print strategy that has removed the need for people to work near specific printers.

Refreshing our real estate. For larger sites across the UK, we’ve chosen to design or retrofit offices which pioneered new standards in sustainable offices, reducing their carbon footprints between 58% and 90% versus previous or similar offices. Three of them have been recognised by BREEAM with the first ever ‘outstanding’ rating in their categories – new build, retrofit and multi-tenanted offices. We’ve achieved this by coordinating the entire buildings’ ecosystems to be more sustainable - from the layout and choice of construction materials to the integration of technology, supported by sophisticated building management systems.

Investing in new technology. We’ve been piloting and deploying new low carbon technologies throughout the last ten years. Investing in site-specific tri-generators that run on recycled cooking oil is one such example. Installing intelligent lighting that minimises energy consumption by only topping up natural daylight to the required lumens for a working environment, is another. This has not only helped reduce our greenhouse gas emissions, but has helped to mainstream a host of technologies that were unproven at the time we tested them out.

As the climate change agenda has evolved, companies are increasingly expected to take responsibility for all their carbon emissions – not just those associated with their energy. This means measuring and managing scope 3 emissions. For us, they largely comprise business travel which is now our primary source of greenhouse gases.

Reducing travel in a service business like ours is challenging, as it’s part and parcel of delivering services for our clients and is affected by economic ups and downs, and the degree to which our business is international in nature. We set ourselves a ten year goal to hold travel carbon emissions flat whilst growing the business and in 2017 were delighted that, in fact, we exceeded this, posting a 4% reduction over our 2007 baseline. Most of it was delivered by drastically cutting emissions from internal flights (by 88%), through enforcing a strict travel policy for our people. For client-related travel, our focus has been on building a culture that is comfortable to connect from anywhere, anytime, and encouraging collaborative technology as an alternative to travel.

We’re proud of our achievements over the last ten years and, as we look forward to the next phase of our carbon journey, believe we can do more. Even though we’ve offset any residual carbon emissions reported each year to achieve carbon neutrality, we’ve nonetheless set new, 2022 targets: reduce our total carbon footprint by 40%; procure 100% renewable electricity; and further reduce our travel intensity - whilst continuing to grow our business.

This document sets out our journey. Pages 2-5 provide a summary of what we’ve achieved, what we’ve learnt and where this is taking us next. The rest of the document shares detailed information about the approaches we’ve used, the initiatives we’ve tried and - as far as is possible - the benefits each has delivered. We hope that it offers practical tips and hints that will be useful for other organisations and help accelerate the transition to a low-carbon economy.
What we’ve achieved over ten years

We set ourselves challenging ten-year targets to 2017, looking to reduce our environmental impacts whilst growing our business. We wanted to reduce our total, absolute carbon emissions by 25%, halve our energy and resource consumption, and hold our business travel carbon emissions flat.

We’re pleased with what we’ve achieved. We’ve cut the carbon footprint associated with our energy consumption (i.e. scope 1 and 2) by a full 77%, and our total carbon emissions (i.e. scope 1, 2 and 3 - including travel etc.) by 29%, whilst almost doubling the size of the business. In intensity terms, our scope 1, 2 and 3 carbon emissions per £ revenue have dropped 6.4% year-on-year, which compares favourably to the reductions of the UK and G20 over the same period, as reported in PwC’s Low Carbon Economy Index (www.pwc.co.uk/lowcarboneconomy).

Reducing energy use in our buildings

The lion’s share of the carbon reduction has been driven by the fact we’ve halved our energy consumption over our ten year journey - using four main levers: just under a third came from changing how we operate our buildings; reducing our space from 9.6 to 8.1 square meters per person (a reduction of 16%) has contributed 12%; refreshing our real estate or moving to more efficient building stock has contributed 31%; and around a quarter came from investing in new technologies (see Chart 1).

Combined, this equates to 41 million kWh of energy saved – enough to power 4,000 homes for a whole year. Part of this is because we’ve consolidated our office floor space, but we’ve still seen a 47% drop in energy use per square metre.

As we’ve made our buildings more efficient, the mix of energy we’ve used has changed noticeably. Back in 2007, 80% of the energy consumption came from heating, cooling and lighting, with only 20% arising from small power – devices like laptops, phone chargers and printers. By 2017, small power accounted for double this, at 40% of the reduced total energy needs in our offices.

It has saved us nearly £20 million in direct energy costs over ten years. It’s also saved us £1.3 million in carbon emissions costs from the government’s CRC scheme, and £0.4 million in voluntary offsetting costs, which we choose to buy to allow us to be carbon neutral.

Running our buildings on clean energy

Where possible, we’ve switched to low-carbon alternatives for energy in our buildings. In 2007 we had no renewable energy but in 2017, 50% was provided by renewable sources.

41% of this total came from our move to renewable electricity in the offices we control. The remaining 9% of our renewable energy came from running the tri-generators in our London offices on biodiesel as this is a different type of renewable fuel.

Reducing energy use and switching to clean energy have together delivered around 25% of our scope 1, 2 and 3 carbon emissions reduction (see Chart 2).

Decoupling our travel footprint from business growth

Our ten-year target, to 2017, was to hold our total travel carbon flat in spite of business growth. In fact, we exceeded that goal and reduced our footprint by 4% whilst revenues grew 44%. This equates to a reduction of 12% per full time employee as we’ve increased the number of people in our business. It has contributed 2% of our total scope 1, 2 and 3 emissions reduction (see Chart 2).

The biggest change we’ve made has been to our internal air travel, where we’ve reduced the carbon impacts by 88% in ten years, largely off the back of a more stringent travel approval process. This represents 58 million kilometres per year, the equivalent of nearly 1,500 round-the-world trips. We’ve also cut the carbon footprint of our total (internal and client facing) road and rail travel by 48% and 13% respectively.

Our client-facing air travel is a different story. We’ve worked hard to incentivise cleaner modes of travel and maximise the use of economy class, as well as making online collaboration possible and more acceptable. However, the geographic expansion of our business has led to more international travel. At the end of 2017, client-facing air travel had actually increased significantly, and - having reduced the vast majority of greenhouse gases associated with our energy - represented...
80% of our total carbon footprint. This makes it a challenging element of our carbon footprint and one that will remain a key focus of our environmental agenda for the future.

That said, we’re delighted that the emissions per kilometre for our combined flights (client facing and internal) were down by 17% in 2017 versus 2007.

**Reducing emissions from our resource use and waste**

As a professional services firm, we don’t rely upon many natural resources, with paper being our largest. Nonetheless, we’ve taken action to measure and reduce our impacts: since 2007, our emissions associated with material use have dropped 44% and those arising from our waste by 45%. Respectively, these have contributed 2.9% and 0.1% to the 29% reduction in our overall, scope 1,2 and 3 greenhouse gases (see Chart 2).

**Obtaining carbon neutrality**

We’ve offset our residual emissions, as reported at the end of each year since 2007 with verified carbon standard credits. This means we’ve been carbon neutral for ten years.

**Building trust in society**

Our programme has delivered qualitative as well as quantitative benefits. We’ve been recognised in the market for our progress in addressing our carbon footprint through various standards and awards, such as the Carbon Trust. We’re able to share these with clients and suppliers to help demonstrate our commitment to our environmental agenda.

Our people tell us they’re proud of our sustainability agenda, with over 4,000 signed up to receive regular updates on our progress. We’ve also had thousands of clients, policy-makers and international delegations approach us to find out more about our pioneering approach to sustainability in our buildings, and we’ve held workshops with suppliers and our wider network of PwC firms to share our learnings as set out in Table 1 on page 4 and the rest of this report. We hope this has helped them to reduce their own carbon footprints.

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2. Attributing carbon emission savings to the different energy-related levers is challenging as it depends on the mix of energy sources for each initiative. In general, we’ve assumed an average energy mix for each initiative although have made some adjustments to suit our business (e.g. all carbon emissions related to oil are assigned to ‘consolidating our real estate’, as we vacated our oil-powered offices early in our carbon emissions reduction journey). Percentages do not add up to 29% due to rounding.
# Lessons Learned

## Table 1

| Take your leadership on the journey with you | Managing carbon emissions is a complex topic. Getting your leaders on board early with your approach will give them time to understand the issues, provide guidance and support, and make it easier to secure any necessary funding when you need it. |
| Use targets to mobilise action | Targets are a powerful way to energise your business to act on carbon. Your aim should, of course, be to set goals based on carbon science. Using interim targets as steps along the way allows you to build confidence in what’s feasible. |
| Measure only what you need now, with an eye on the future | You don’t need sophisticated measuring to get going. Establish what data you can get hold of quickly to get started, then gradually increase the breadth and sophistication of data you collect as your needs evolve. That way, you don’t get bogged down in unnecessary detail, and can phase the costs of measurement so they can be absorbed into ‘business-as-usual’ budgets more easily. |
| Investing in expensive technology isn’t essential to drive change | You can make sizeable improvements by changing the way you operate, challenging the status quo and embedding a carbon emissions mindset into your decision processes. Technology can often augment these improvements, but is not a prerequisite for change. |
| Adopt a ‘do-learn-do’ attitude | Establish processes for trialling and evaluating approaches before rollout to identify suitability and actual performance versus claimed benefits. |
| Re-evaluate technology options regularly | If you do consider new technologies, make sure you’re relying on up-to-date information. Not only do new technologies appear all the time, but the cost, payback and environmental impacts of solutions change frequently. You may find technologies that you’ve previously rejected are now entirely suitable. |
| Look outside for support | There’s a lot to consider when managing your carbon footprint. Don’t be afraid to get support from specialist third parties for the areas you feel less confident in, be it calculating carbon emissions, meeting regulatory requirements or evaluating suitable technology. |
| Set common goals with partners | Many changes will require collaboration with third parties, especially suppliers and landlords. Try to agree common goals upfront and determine measures of success. Consider sharing the financial benefits from your initiatives to incentivise and motivate your partners. |
| Stay connected internally | There’s no point investing in a building’s sustainability features, only to find you’re moving out of the office within the year, or encouraging your people to change their travel behaviours when they’re about to be relocated. Work out where your interdependencies are and keep in touch across your different teams (facilities, real estate, travel, IT, communications, sustainability etc.) so that your successes last. |
| Expect behaviour change to take time | In some cases, you might be able to shift behaviours over-night – for instance, if a new environment forces people to adjust their habits, like moving office. But in most cases, it’s a slow and time-consuming process and can be disruptive to your people. Do what you can centrally first, and only embark on behaviour change campaigns where there are no other ways to achieve the impact you desire. |
| Celebrate your achievements | Be proud of what you achieve and share it with your people and other stakeholders. It helps to engage your people and and earns you the right to encourage them to take action. It can also help you to gain support from your leaders and build your reputation as a responsible business. |
What next: supporting the transition to a low carbon economy

Since the Paris Agreement and the launch of the SDGs in 2015, the role businesses play in limiting the impacts of climate change has taken centre stage, with a step change in the number of companies making bold commitments to decarbonise their operations.

We’re already on the front foot, having made great progress in reducing our carbon emissions over the last ten years. We now operate from a dramatically leaner and more energy-efficient set of offices, with robust practices in place to track and improve our performance.

But as we look forward, we know there’s more we can do.

Chart 3
Our 2018-2022 Responsible Business Framework

Our new responsible business framework
This year, we’ve refreshed the way we view our sustainability programmes, aligning them better to social outcomes. We’ve identified eight key ways (see Chart 3) in which we can make a positive impact for our business and society, one of which is by supporting the transition to a low carbon economy. Over the coming five years, from 2018 to 2022, we intend to drive these outcomes in a more integrated way across our value chain, including our client work, core operations, supply chain and community engagement.

It means our new strategy will contribute to tackling the most important problems for society in the UK and which are needed to ensure a stable economy, vibrant society and healthy planet that benefits everyone.

For our carbon emissions, this still means driving operational improvements across our business. But it also means working with our suppliers and clients to help us achieve our goals, and encouraging them to tackle their own carbon footprints – after all, our supply chain contributes more to our environmental impacts than our own operations (see our ‘total impact’ results for details). In addition, we’ll engage with our communities on carbon emissions through our environmental volunteering, helping to build awareness of climate change amongst our people.

Setting new targets
As our ten-year targets expired in 2017, we’ve taken a fresh look at where we are and what we could achieve, setting new targets out to 2022 (see Table 2). We applied a rigorous approach to defining these targets (see ‘Setting our 2017 targets’ on page 11), considering what was feasible, then looking externally at national requirements and benchmarking against other companies.

Overall, we’ve set a new target to reduce our total, absolute carbon emissions by 40% by 2022 (from our 2007 baseline), in line with climate-science thinking.

Managing emissions from business travel is central to our approach as it’s now 80% of our total carbon footprint. So we’ve set a new target to reduce travel carbon emissions per person by a third (versus 2007), within the next five years. The focus will largely be on client-facing travel, though, as our internal business travel is now only 12% of 2007 levels. We’ll continue to promote low-carbon modes of transport and encourage our people to connect with clients via collaborative technologies, wherever possible.

We’ll continue to drive our energy consumption down, too. As our programme matures, however, the opportunities for big improvements are diminishing and we also expect our business to keep growing. So we’ve set a target to maintain a 50% reduction in absolute energy consumption against our baseline year in spite of this growth.

To help us shrink our carbon footprint further, we’ll keep choosing renewable energy in our offices where we can, and have set a new target to purchase 100% of our electricity from renewable sources, including in our landlord-controlled buildings. We’ll also maintain our carbon neutral status, offsetting our unavoidable emissions.

Our full story is set out in the rest of this document.
Why focus on carbon emissions?

The impacts of climate change on our planet are now being felt acutely across the globe. Hurricanes and wildfires are devastating communities, coastlines are threatened by storm surges and sea level rise, water availability is changing, and vast areas of land are becoming infertile. The social and economic consequences of these changes are widespread, with the poorest people who are least equipped to cope often affected the most.

The carbon emissions from our business operations contribute to global warming and therefore the changes in climate. Although our carbon footprint is small compared to many industries, it’s still our largest environmental impact, so we’re committed to doing what we can to minimise our emissions, as part of being a responsible business.

Market momentum

Ten years ago, in the early stages of our carbon journey, there was little precedent for companies in the professional services sector to manage their emissions. At the time, the Kyoto Protocol had recently come into force and the market was largely concerned with reducing the footprint of certain heavy industries: the EU Emissions Trading Scheme (EU ETS) had launched to regulate and reduce greenhouse gas emissions for these organisations. But things were about to change.

The CRC Energy Efficiency Scheme was on the horizon in the UK, incentivising all large businesses to reduce their carbon emissions. In addition, the carbon disclosure project (run by CDP) and Global Reporting Initiative (GRI) were gaining traction and prompting companies in various industries to formalise their carbon reporting.

This momentum has continued over the last ten years, with the Paris Agreement in 2015 demonstrating a new level of commitment to reducing greenhouse gas emissions, around the world. The Agreement was signed by 195 countries, and private companies are now expected to contribute to their respective national goals.

Stakeholder interest

As the expectation for all businesses to manage their carbon footprints has grown, so, too, has the direct interest from our stakeholders. We receive numerous requests to report on our carbon emissions - and our actions to reduce them - from clients, or third party benchmarking organisations appointed by them, such as CDP and EcoVadis. We’re also increasingly asked about our environmental performance directly from clients, when tendering for work.

By making an early commitment to manage our carbon footprint, we’ve been able to respond quickly and comprehensively to our stakeholders as their expectations have evolved. It’s also helped us to lead by example, and many clients have turned to us for support as they’ve started to think about their own approach.

Commercial sense

Besides market and stakeholder requirements, many of the initiatives we’ve put in place have been driven by commercial decisions: reducing energy consumption in our buildings not only reduces carbon emissions, but also saves costs.

Energy consumption and business travel are also business continuity risks for our firm – our business model relies heavily on our people being able to use our offices and travel to clients. So reducing our dependency on both not only helps to reduce carbon emissions, but reduces our exposure to business disruption.

Contributing to the delivery of the SDGs

In 2015, the 193 United Nations member states unanimously agreed to deliver 17 global goals (the SDGs) underpinned by 169 specific targets by 2030 in order to achieve a thriving society in a thriving environment. Our carbon emissions initiatives support several of the goals, especially:

- **Goal 7**: Affordable and clean energy - target 7.2 and 7.3
- **Goal 13**: Climate action - target 13.3

There is a growing expectation that businesses will help to deliver the global goals and, as a responsible business, we feel we should proactively support the transition to a low carbon economy.
Our start point

In 2007, we set about measuring our carbon emissions to help us understand where we should focus our reduction efforts. We had calculated a high-level footprint prior to this, but felt we needed a more robust approach to reflect the growing maturity of carbon reporting. Later, we also sought internal and external assurance of our data, to validate our results.

The majority of our carbon emissions in 2007 stemmed from the energy used in our buildings (54%), primarily electricity. The rest was from our business travel, particularly flights to clients or for internal (i.e. non client-facing) purposes (see Chart 4).

Defining our scope

We used the Greenhouse Gas Protocol (GHG Protocol)12 to guide us through the steps needed to measure our carbon emissions. These included setting the boundaries and scope of measurement, agreeing on the material sources of emissions, and estimating for missing data.

At the time, many companies were choosing to only report their Scope 1 and 2 emissions, i.e. those related to sources controlled directly by their organisations (such as fuel used in their boilers or company-owned vehicles) as well as purchased electricity. However, since travel was a significant proportion of our total emissions and integral to the way we do business, we felt we should look to report on, and reduce, emissions related to our travel, too.

Calculating our emissions

We started collecting consumption information, and found we could get good energy data from utility bills for the buildings we controlled. Landlord-owned offices and multi-tenanted buildings, however, required more effort: we had to request the data and, in some cases, needed to estimate our share of the energy use, based on the proportion of the total floorspace we occupied. It took a bit of time, but didn’t prove to be too difficult.

Travel data, on the other hand, was less straightforward. We were able to get accurate data from our travel service provider on the nature of our business flights, including destinations and class of travel - all of which influence the carbon footprint. But for other modes of transport where bookings were less centralised, we had to use our expenses system and ‘convert’ the spend back to travel consumption in miles. This data required much more manual intervention, with only road data being robust enough to be included in our first year of measurement.

Once we had consumption data, the final step was to convert this into carbon emissions using Defra’s carbon conversion factors13.

Opportunities for carbon reduction

With energy use in our buildings forming the largest part of our emissions, and with most regulation and reporting in the market focused on scope 1 and 2 carbon emissions, reducing our energy use was a top priority.

Looking at our building stock in 2007, we had 43 offices across the country, many of which were small, and no longer suitable for our business needs. Furthermore, many of our buildings were old-fashioned and in need of refurbishment, with a wide variation in energy performance. This presented us with a great opportunity to embed more energy-efficient ways of working as we consolidated and upgraded the portfolio, and formed the starting point for our carbon emissions reduction initiatives.

Business travel also needed our attention, as it accounted for 46% of our overall greenhouse gas footprint. Flights formed the lion’s share of this, at 74% of all travel. And, half of our flights were from non client-facing air travel, which was fully within our control so this was one of the areas we targeted for early intervention. (Client-facing air travel was more difficult as it is a necessary part of how we serve our clients. Nonetheless we still wanted to do what we could and felt there was an opportunity to challenge ourselves and our clients to adopt new ways of working which had a lower carbon footprint. We sought to address this a little later on.)

11. Since first reported, we’ve updated our 2007 carbon emissions to reflect better data availability and Defra’s annual carbon factors. See our scorecard for the latest data: www.pwc.co.uk/who-we-are/corporate-sustainability/ performance.html
12. www.ghgprotocol.org
Setting up for success

Embarking on a journey to reduce carbon emissions can be fairly daunting as it’s a very dynamic agenda which requires regular re-evaluation of priorities and solutions to be effective.

Over our ten year journey, new technologies were continuously being developed and payback periods were changing. Carbon science was evolving, revealing new impacts or different conversion factors. Government support or regulation was still maturing and altering the financial implications of carbon management programmes, whilst stakeholder expectations were increasing and we were being asked to use different vehicles for the disclosure of our practices and performance.

To help manage this uncertainty, we agreed on a set of principles for how we would operate, and took a series of actions which provided us with the right structures to be able to reduce our carbon emissions effectively, as described below.

Agreeing principles

We agreed some principles to guide us in our approach to reducing carbon emissions, including:

• Minimise disruption to our people.
We’ve found that many changes can be made with little to no impact on our people - for instance, changing technology in our buildings in the evenings or weekends so that we didn’t have to close our offices. Where the change affected our people or needed them to behave differently - for instance moving offices or removing desk side bins - we communicated early so our people had time to adjust and respond if necessary. This approach has made it easier to get buy-in for our actions.

• Adopt a data-driven approach.
This has not only helped us to track our progress in reducing our carbon footprint, but also to refine and strengthen the business case for our various investments, over time.

• Leverage our real estate refurbishment programme to adopt new technologies.
Although this was not always possible, timing the introduction of new technologies to our building renewals has generally helped us to adopt better technology at a lower cost and with greater engagement from our people.

• Pilot new technologies in one office.
This has been particularly important where we’ve pioneered emerging technology. It’s allowed us to ‘give it a go’ for technologies that would ordinarily be discounted as too risky or where the business case wasn’t as clear as it might be. Trialling the options has allowed us to validate their feasibility and financial returns, improving their success rate once installed across our whole portfolio.

• Use third parties for inspiration and support.
We haven’t been afraid to lean on external experts to help us identify and implement new approaches and technologies for reducing our carbon emissions. There’s a lot of information in the marketplace and you can save time and money getting targeted support. The same would typically be true for policy and regulation advice, too, although we’re uniquely placed by having deep expertise on these areas in-house which we can draw on.

Engaging leadership

We engaged our leadership early on in our carbon journey, educating them on climate science and the opportunities and risks around carbon management. By doing so, we’ve gained support for setting ambitious targets as well as approval of an ongoing, additional, annual budget to invest in a wide range of carbon reduction initiatives and technologies.

We’ve also secured dedicated resources to focus on our carbon emissions, including a full time sustainability reporting team, a behaviours team - which encourages our people to adopt sustainable habits such as using online meetings instead of travelling – and an energy manager, who brings initiatives together across offices and technologies.

Setting targets

We gave a great deal of thought to setting our targets. They not only motivated us and guided our actions, but also

“Acting on climate has helped us reduce costs and enabled us to do our bit on a critical global issue, supporting our commercial strategy.”

Kevin Ellis, Chairman & Senior Partner, PwC UK

formed the basis for our discussions with leadership and our communication with wider stakeholders.

We wanted our targets to be a stretch, whilst still being feasible. We also wanted them to demonstrate our commitment to national and global goals for carbon reduction. And, we’ve increased the level of ambition along the way, as our confidence in finding solutions has grown (see ‘Setting our 2017 targets’ inset for more details).

Achieving external standards and awards

We sought to get accreditation with relevant external standards and applied for selected awards. These have helped us to continuously improve our systems, have provided benchmarks of our performance against other companies, and have given us a platform from which we’ve been able to showcase our successes to our people, our clients and other stakeholders. Indeed, we’ve had extensive interest in our green buildings and carbon reduction achievement from clients, policy makers and international delegations alike.

The main carbon-related standards - which we obtained for all of our offices - are ISO 14001 (since 2008) and, subsequently, ISO 50001 (since 2012), both of which have encouraged us to improve our processes relating to energy management. We also applied for and received the Carbon Trust standard which was particularly stringent as it required us to demonstrate three consecutive years of progress and instilled a performance culture in our business.
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Publishing policies
Early in our journey, we developed an environmental policy and an energy policy which set out both our targets and our wider commitments to managing our environmental performance, including our carbon emissions.

The policies were signed off by our leadership and published internally and externally, formalising our intentions and holding us to account over our actions. They also demonstrated to our stakeholders that our leadership was committed to reducing our carbon footprint.

Agreeing a measurement approach
Having good data is essential to track progress and identify opportunities for improvement. But this doesn’t necessarily mean investing heavily in technology and software right away. Indeed, we’ve chosen to improve our measurement in stages and at times when it made sense from a business point of view.

Our energy management system is one such example. Ten years ago, we used monthly energy data which was more than enough to get us going, and just supplemented with spot tests, if needed. Over time, we introduced Automatic Meter Reading (AMR) into many of our offices, which enabled us to analyse our energy profiles and identify opportunities to optimise our energy performance (see Energy: Operating differently for more details).

Our greenhouse gas emissions reporting has matured in similar vein. Having started with just spreadsheets, we quickly invested in a simple reporting tool, based on a facilities management package. This helped us calculate our carbon emissions more efficiently, and provided a single repository of data that various internal stakeholders could access, saving time for everyone involved.

After a few years, though, it was unable to cope effectively with advanced carbon calculations, bespoke estimations, or robust workflow for data sign-off and audit. Therefore, we opted to upgrade to a more advanced system, designed specifically for sustainability reporting - and which was able to track all our social and environmental impacts across our operations and supply chain.

In each case, by keeping an eye on our future requirements and opting to invest in better measurement only when we needed it, we’ve been able to phase the costs so that they could be more easily absorbed into business-as-usual budgets.

Obtaining assurance
Having accurate data gives us confidence to make business decisions and helps us to build trust with our stakeholders. To that end, since 2007, we’ve had our carbon emissions methods, data and results assured by our Internal Audit team. Since 2012, however, we’ve also received external limited assurance from our financial auditors against the ISAE3000 standard (including for our baseline year, 2007) and, more recently, against the ISAE3410 standard, too.

The annual audit provides a useful steer for improvements we should make to our measurement and reporting in the following year. In addition, knowing that our processes and data will be scrutinised has instilled a real culture of ongoing rigour and accuracy in our teams, such that we’re always asking the question ‘Is this good enough to be audited?’

Creating partnerships
Many of the improvements we’ve made, either in the way we operate or with the technology we’ve adopted, have depended on our suppliers and their willingness to support us in trying something new.

We sought to identify strong collaboration partners, engaging them early in any project so we could align on expectations, share expertise and agree on a common set of goals. This partnering approach has allowed us to deliver ambitious results, to schedule, and in a relatively short period of time.

For examples of our partnerships, see our Energy: Consolidating our office space, Energy: Refreshing our real estate and Energy: Investing in new technology sections.
Setting our 2017 targets

Developing our targets
We set our 2017 targets in 2012, triangulating three different inputs – internal feasibility, national requirements, and the competitor and market landscape. We synthesised these, collating them into a communications message that was simple to understand and compelling to all our stakeholders.

Feasibility: Having agreed with leadership that our environmental performance was a priority, a modest annual investment budget was set for carbon reduction initiatives where the business case was unproven. This allowed us to ‘test’ options quickly, without having to request funding for each individual project, and gave us the confidence to set ambitious targets. We then evaluated different solutions to determine what level of carbon emissions reduction might be feasible for our business with full deployment.

National requirements: We also wanted to ‘do our bit’ towards the national goal, but the UK’s carbon budget isn’t set at a company or sector level, so we calculated the rate of decarbonisation that would be needed for the UK to achieve its 2050 target of -80%, establishing ‘a compound annual reduction rate’ which we could apply to our ten year time horizon. We compared this against what we thought we could achieve and determined that it wasn’t very challenging if we were to opt for a scope 1 and 2 emissions goal only. Instead, we decided to cover all our measured carbon emissions, extending beyond the national goals by including our business travel.

External benchmarking: Next, we looked at a wide range of other companies’ targets, including sustainability leaders, to guide us in setting our own. We wanted to know not only how our level of ambition compared, but also how other companies chose to present their targets. Some of our key findings were:

- Whilst most companies focused on their scope 1 and 2 emissions, scope 3 was also included by leaders in each sector.
- Intensity and absolute targets were equally common, although leaders often set both (Today, an intensity target is mandatory for all listed companies in the UK, but absolute targets remain the gold standard and are expected by environmental NGOs).
- When resetting targets, companies often maintained their original baseline.
- There was a wide range of time horizons for targets, including very short and very long term, although one or five year timeframes were preferred, aligning to ‘round’ numbers or UK milestones (e.g. 2022, 2030).

• Many companies were early in their carbon reduction journey and had, so far, only set short term targets below the % reductions needed year-on-year over the long term if they were to help truly tackle climate change (see www.pwc.co.uk/lowcarbonforyou for up-to-date annual reductions needed for each country to deliver the Paris agreement).

Setting our targets
Despite our business being forecast to grow, we opted for an absolute goal to ensure we were playing our full part in addressing climate change. We kept our 2007 baseline (used for our 2007-2012 targets), extending the horizon to ten years, which reinforced the long-term nature of our journey. Meanwhile, the five-year time horizon (2012-2017) was short enough to keep us focussed and long enough to be able to implement the changes needed.

We wanted our targets to be easy to communicate, too, so that our leadership and stakeholders could get behind them. The concept of ‘decoupling’ our carbon emissions from our business growth really helped as it was a simple yet bold message that resonated with people. We chose complementary numerical targets for our other environmental impacts to create a memorable, holistic message:

Our goal: to reduce our carbon emissions by 25%, by holding our travel carbon flat and reducing all other material and waste impacts by 50%.
Energy: Operating differently

As a service organisation, the energy we use in our buildings was our largest direct environmental impact, and one of biggest contributors to our overall carbon footprint, comprising 54%. This made it a priority for our environmental agenda and one where we’ve focused the majority of our reduction initiatives over the past ten years. As a result, in 2017 it represented only 13% of our total greenhouse gas emissions.

Changing how we operate was mostly about aligning our energy use with building occupancy and eliminating unnecessary consumption. These changes required very little direct investment, but careful planning was critical to avoid business disruption. The main initiatives are described below.

Challenging our operating hours
Back in 2007, our offices had manually-operated lighting which meant that it was often left on unnecessarily. Part of the reason for this was that our cleaners and maintenance contractors were on site out of hours, so we moved to daytime cleaning and maintenance, where possible. This not only saved up to 60 hours of lighting per week but also gave our suppliers’ employees more sociable working hours.

In addition, we performed walk-arounds in our offices and discovered that lights, printers and small power equipment were often left on out of hours. So we asked our cleaners to turn them all off at the end of each day.

Managing temperature more closely
During operational hours, we found that we were heating our buildings to a higher temperature than we needed to, wasting energy. In fact, every 1°C reduction in temperature in our offices saved up to 8% of our energy consumption in that area. So we reduced the temperature where we could, in particular making washrooms and common areas cooler than our practice floors.

Ultimately we need our offices to be comfortable places for our people to work, so we were careful to communicate to our people about these changes and made sure we took special notice of any feedback we received, re-adjusting the temperature if it was affecting our people.

We also consulted with our IT providers to increase the ambient temperature in our main server rooms from 18°C to 22°C, a move which reduced our cooling requirements and energy consumption in that part of the building by 30% whilst having no detrimental impact on performance.

Conducting proactive maintenance
When equipment malfunctions, it can consume more energy than needed - for instance, if it no longer turns off when it’s supposed to. We saw this a few years ago in our Union Street office, where the controller for the gas boilers had stopped working, causing them to run continuously during evenings and weekends.

We identified the problem and acted quickly to fix it, preventing waste in excess of 40% of expected consumption. Moreover, these fixes don’t need to be difficult: in our case, we simply replaced a controller that cost less than £200 with no disruption to the business.

But conducting proactive, regular maintenance is important to prevent malfunctions occurring in the first place. We routinely check and replace any worn parts and ensure that all of our equipment is running as it should. We also clean our machines, removing restrictions to heating and cooling, such as blocked grills, obstructed radiators, or clogged air filters. This not only helps to extend the life of our equipment and keep costs down, but it also all helps our equipment to run more efficiently, reducing our carbon emissions.

Using our BMS to drive efficiency
Whilst none of the changes above required an advanced Building Management System (BMS), investing in such a system has allowed us to go a step further in improving our operational efficiency. It offers sophisticated analysis, assessing power consumption, flow rates and temperatures at the level of individual floors or items of mechanical equipment and allowing detailed and continuous profiling of our consumption. For example, at its most basic, it can compare prior year data and identify when equipment could be shut down (see Chart 5 on page 13).

Another area where our BMS has been really effective is in identifying conflicts. In several instances, for example, our heating and cooling were operating simultaneously. Investigating these further, we discovered this was caused either by poor installation (e.g. wrong location of sensors, or incorrect programming) or equipment malfunction (e.g. broken sensors or the equipment shutting off). We were able to resolve such conflicts and reduce our energy consumption as a result.

Moreover, our BMS now has software that allows it to control our ventilation, lighting and power which - combined with improved controls that allow different zones in the office to be managed separately - means it can ‘learn’ how to operate more efficiently. For example, it can automatically work out when the best time to cool or heat the building is, based on when lighting systems are in use - a feature that is particularly useful given that the needs and working habits of our people are constantly evolving.

We’re still learning how to get the most out of our BMS and constantly finding new opportunities for energy reduction.
Most recently, we’ve been configuring it to automatically flag when consumption tolerances have been breached so that we can identify issues even earlier.

**Switching to renewable energy**

We’ve invested in low carbon energy in our buildings by buying electricity from renewable providers where possible, as well as by generating energy on-site using renewable sources. Since 2015, we’ve sourced renewable electricity, backed by Renewable Energy Guarantee of Origin (REGO) certificates, for all the mainland UK offices that we operate ourselves.

In addition, our tri-generators in our London offices run on locally sourced biodiesel made from a waste material (see ‘Energy: Investing new technology’ on page 18). Whilst this doesn’t help us to reduce our energy consumption, we choose to do it because it reduces our carbon footprint and supports the UK market for renewables, helping Britain transition to a low-carbon economy.

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**Chart 5**

BMS data showing year on year energy consumption - highlighting growing gap between 2017 and 2016, and culminating in significant anomaly at weekend. 2017 consumption drops and tracks in line with prior year from the day of corrective action.
Energy: Consolidating our office space

At PwC UK, we have a rolling real estate portfolio enhancement programme. This is necessary to ensure that our buildings support our business strategy, by providing suitable office space for our people and clients. We renew the buildings for the latest working styles and for our changing business populations, with an eye on cost and productivity.

But improved environmental performance has also been a key aim, and the real estate renewal has provided several effective ways to reduce energy consumption and the associated carbon emissions. Primarily, we’ve saved energy through reducing the space we occupy, either by making more efficient use of our space, or consolidating our offices. Second, we’ve upgraded our buildings to maximise energy efficiency, as described on page 15.

Using space inside our offices more efficiently

Our people now spend less time in our offices, and more at client sites or working remotely. When on site, they’re also working differently, requiring different types of space. This has led us to rethink how we use our offices so they serve their needs better whilst reducing our carbon footprint.

One of the most successful ways we’ve done this has been switching from permanent desks to a ‘hotelling’ system, where our people ‘check in’ to a desk for the hours they need it. We built up a picture of the demand for desks by conducting surveys in our offices, interrogating our ‘access control’ data from security gates, and using our BMS to see which areas of our offices were used the most.

Adopting hotelling has increased our average people per work station - achieving 1.7 in our latest office, in Manchester - and by occupying less space, we’re not heating or lighting as much.

Interestingly, our print strategy has played a key role in enabling hotelling: historically people’s seating location was determined by the need to be connected to individual desk-side printers. A move to multi-functional devices in printer ‘hubs’ freed up desk choice by linking groups of people to a printer path that was based on a wider area, and our subsequent move to ‘follow-me print’ has allowed our workforce to fully embrace flexible working, as they can print from laptops or phones to any device in our UK network.

Another driver of our energy reduction involved identifying the underused areas of our buildings and putting them to better use, too. For example, we found that the restaurant areas were only in use for a few hours a day, so we converted them into booths where our people could not only eat their lunch, but also hold informal meetings at other times of day, adding foldable doors for privacy and noise control. Rooms allocated to the partners (i.e. the owners and leaders of the business) were also fitted out with furniture, conference dishes and screens for presenting information, and were added to the room booking system, which allowed them to be used as meeting rooms when partners were offsite.

We’ve also created more collaboration space (e.g. ‘breakout’ areas, meeting or seminar rooms, etc.) to reflect the latest ways of working and allow us to engage in different ways with our clients. But with individuals working in more fluid ways, we have found that desks can often be allocated but not occupied and are now evaluating the possibility of room or desk bookings in smaller slots, with the aim of increasing utilisation even further.

Consolidating our portfolio of offices

On occasion, we need to change the nature of our office portfolio for business reasons. We might need more people in a certain region to accommodate growth, for instance, or want to bring people together from different locations so they can collaborate more effectively.

We try to time these moves with the end of leases on our buildings, or with natural break clauses in the leases, to keep costs down.

These changes present us with great opportunities to use the space more effectively and to benefit from economies of scale by housing more people in one location. For example, consolidating into a smaller number of bigger offices can improve the business case for investment in some types of equipment that reduce energy consumption and which may be better suited to larger properties (see page 18).

Over the past ten years, we’ve been able to house an extra 2,200 people (out of a total of over 21,000 in 2017) whilst consolidating our offices from 43 down to 30. This has reduced the space we occupy per person by 16% and our energy needs per person by 55%.
Energy: Refreshing our real estate

We've been able to save considerable energy, cost and associated carbon emissions by refreshing our offices across the UK. There have been two main methods. For smaller offices, we've relocated to newer, pre-existing buildings, which offered lower energy losses and a smaller carbon footprint. For larger offices and locations where we were expanding, we've designed our own sustainable buildings, either from scratch, or by retrofitting our existing properties.

Relocating to more efficient offices
Relocating can be extremely disruptive and takes a lot of effort to get right, so our decisions to move aren't taken lightly. In each case, we first carefully assess whether we could retrofit our existing offices, as we did at our headquarters at Charing Cross in London.

But, if the building is too small for our needs, if the construction and design is too old to be able to get up to good working and environmental standards, or if we have little influence over it because it's a tenanted building, we may consider relocation and our operational and real estate teams collaborate to proactively identify ways to improve our environmental performance.

As a result, we usually see an instant improvement in our carbon footprint. In Reading, for example, we moved around 360 people to a new office in 2014, achieving a 43% reduction in carbon emissions in the first full year.

If operational control for a new office lies with the landlord – when we're only looking to occupy a few floors in a building, for instance – we engage with the landlord early on, before committing. This gives us confidence that we'll be able to work together to meet our energy and carbon objectives.

Designing sustainable buildings
Over the past ten years, we've worked with architects, engineers and construction companies to design many of our own buildings, either as new builds or retrofits.

In each case, we've aspired to the highest sustainability credentials we can, using the BREEAM standard, a leading sustainability assessment method for buildings, as guidance for our design decisions. We take every aspect of building design that could influence our carbon emissions into account, including the structure, internal layout, technology and operational practice.

One of our first considerations is how to maximise the use of daylight. For a new-build office, choosing the right shape and orientation of the building can really increase the amount of natural light, as does including as many windows as possible – both our More London and Leeds office have walls of glass to let the light in. When we retrofit an office, like at Embankment Place, it can be more difficult as the structure can't easily be changed. Here, we used the atriums to bring daylight down through the middle of the building. We also moved to an open plan layout, removing any offices and other obstacles which were blocking light from reaching into the centre of the building.

Inside the offices, we've introduced state-of-the-art technology which minimises energy consumption. In fact, we've found that implementing innovative technology for an entire building has huge benefits because we can ensure it all works together effectively. Our efficient chilled beams in More London work in conjunction with our trigenerators, for instance, and our intelligent lighting complements natural daylight by automatically adjusting lighting levels. Considering technology holistically has not only allowed us to minimise our carbon footprint but also helped to keep the costs down.

The interior layout can help reduce energy use, too. We've introduced central staircases, wherever possible, encouraging our people to walk around our offices instead of using the lifts. Our open plan layout both lets in more daylight and complements our zonal heating and lighting.

Our passion for designing sustainable buildings has helped us achieve the highest BREEAM rating, ‘Outstanding’, for three of our large offices (see ‘Energy: Raising the bar in green buildings’).
Energy: Raising the bar in green buildings

We've achieved a string of 'firsts' as we've sought to design different types of green buildings, showcased below. As a result, we now have more than 11,000 of our people located in some of the most innovative and environmentally-friendly buildings in the UK.

7 More London
First new-build office to achieve BREEAM offices ‘Outstanding’ rating

Statistics:
• BREEAM (Offices 2008) score 89.07% (in design)
• 7.2 m² per FTE

Overview: Our largest office, consolidating over 6,200 people from a number of locations into a new ten-storey, 44,700m² building near London Bridge.

We planned and built the office from scratch, giving us the opportunity to pioneer new sustainability standards and incorporate a number of cutting-edge technologies. The building was designed to produce a carbon footprint that was a minimum of 58% lower than a standard building of its size and type, and to generate 25% of its energy onsite from low carbon sources.

1 Embankment Place
First retrofit office to achieve BREEAM offices ‘Outstanding’ rating

Statistics:
• BREEAM (Offices 2008) score 96.31% (in design)
• 7.2 m² per FTE

Overview: Our London headquarters, housing 4,500 of our people in a nine-storey 32,600m² building which ‘floats’ above Charing Cross train station.

We retrofit the building over a period of nearly two years, completely overhauling the building's internal infrastructure, whilst part-occupied by our people. The office now emits 90% fewer greenhouse gases and consumes 40% less energy (compared to the same building before the retrofit), while generating 38% of its energy onsite from low carbon sources.

Central Square, Leeds
First multi-tenanted office to achieve BREEAM offices ‘Outstanding’ rating

Statistics:
• BREEAM (Offices 2011) score 89.69% (in design)
• 6.6 m² per FTE

Overview: A new, multi-tenanted building in Leeds, accommodating over 700 of our people in 4,600m² of modern space, split over two floors in a 11-storey building.

We collaborated with the landlord to create a sustainable space which increases the capacity of our Leeds office by 20% while reducing our carbon emissions by 80% and energy consumption by 75% (compared to our previous building).
**Key features:**
- Zip-zag design on the outer perimeter, providing shade and reducing cooling
- Two 0.4 MWh combined heat and power (CHP) trigenerators to provide much of the building’s heat and cooling, and almost 50% of its electricity. Not only are these energy-efficient, but we opted to run them on 100% used cooking oil, a renewable fuel – the first time this had been tried
- Active chilled beams, a system which passes water throughout the building to deliver desired temperatures very efficiently. Made possible by the tri-generators, which supply them with waste heat
- Comprehensive sub-metering and AMR, alongside an automated BMS which allows us to constantly monitor and fine-tune the performance of the building, helping to avoid wastage and find further improvement areas
- Zonal lighting, lighting controls and timers so the lights are only on when necessary. This is enhanced by a digital addressable lighting interface (DALI) system which assesses the natural light and ‘tops up’ the lighting as needed
- Regenerative braking in the lifts and a smart ‘destination’ lift control system to improve energy-efficiency and traffic volumes
- Hotelling system which allowed us to better utilise the space

**Challenges overcome:**

Bringing natural light into the building was an important aspect in being able to reduce our carbon emissions, but it wasn’t easy as the site itself was in a densely populated area of London with other high buildings surrounding it. Designing the office to have an unusual shape with the central section carved out solved this issue.

Achieving the building’s low carbon footprint was also heavily reliant on a number of new technologies, many of which were unproven and didn’t always work as expected, adding extra time, effort and risk to the project. Although worth it in the long run, using bio-instead of regular diesel in our tri-generator was the most challenging example of this. First, we had to work with our supplier, Uptown Oil, to ensure their fuel was the required standard (EN14214) to use in our machines. Moreover, our CHP machines weren’t designated to run on biodiesel, so we had to increase maintenance, reducing the benefits against the plan.

**Key features:**
- Central atria, removing offices which were previously in the middle of the building and adopting an open plan layout, allowing natural light to penetrate all floors
- Two 0.5 MWh tri-generators which run on used cooking oil but, unlike in More London, could use regular diesel to start up. Our experience had taught us that we wanted to start and stop the machines regularly to match demand, but restarting them on biodiesel caused maintenance issues and therefore downtime. These machines have a 35% higher output, producing around 60% of the building's peak electricity requirements and 20% of the heating and cooling load, while emitting 40% less carbon than a typical equivalent plant
- Like More London, renewable electricity contracts for electricity bought off the grid
- Many of the same leading technologies from our More London office, such as efficient chilled beams to replace air conditioning, and regenerative lift braking
- Hotelling system which allowed us to provide more collaboration spaces and fewer fixed desks, accommodating 700 additional people and saving energy

**Challenges overcome:**

Retrofitting a property provides much less freedom than a new build, restricting the technologies and designs available. For instance, insulating the property was difficult, and being unable to make it airtight meant we couldn't totally avoid heating and cooling losses.

For cost reasons, we chose to perform the whole refurbishment whilst still in occupation. To minimise disruption to our people, we refurbished the building one half at a time, relocating people to new floors as they became available. Any disruptive work, such as when the power needed to be down or the entranceway refurbished, was constrained to evenings and weekends.

The office is also located on one of the busiest streets in London, so it was critical that we minimised disruption to the local area. We achieved this by holding workshops with relevant stakeholders (including neighbouring businesses, local residents, and the railway and tube station over which our building is suspended), to ensure our plan was respectful of their wishes, particularly with regard to noise and timeliness, but this did make the project considerably more complex to oversee.
Energy: Investing in new technology

New technology provides us with a great opportunity to reduce carbon emissions in our buildings. We've chosen to pioneer a number of solutions over the last ten years, not only contributing to our carbon reduction targets but also forging the way for others to adopt the technology in the future.

Evaluating technology options

When deciding which technologies are appropriate for our buildings, we conduct lifecycle cost analysis\(^{14}\) of each technology and look for a payback within the period of the lease – typically less than four years. Using the lifecycle cost is important as it allows us to take into account the lifespan of the technology, the cost of implementation and any maintenance costs. In general, we try to invest in new technology when our existing equipment is approaching the end of its serviceable life, or when we’re refurbishing an office so we can install the new technology more easily. But where the benefits have clearly outweighed the costs we have replaced equipment early, or brought office refurbishments forward.

In parallel with our cost assessment, we estimate the carbon and energy savings of adopting each new technology in our offices. This allows us to select a a portfolio of technologies that fits within our energy investment/innovation budget and also meets our carbon emissions reduction targets. The new technology landscape is constantly evolving, so we re-evaluate this on a regular basis.

Table 3

<table>
<thead>
<tr>
<th>Technology</th>
<th>Carbon saving</th>
<th>Marginal cost</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIR(^{15}) lighting controls</td>
<td>High</td>
<td>Low</td>
<td>Sensors that control lighting based on where people are in the building. Can be used to create zones.</td>
</tr>
<tr>
<td>DALI(^{16}) system</td>
<td>High</td>
<td>Medium</td>
<td>Advanced lighting system that reduces lighting demands by monitoring natural light levels and only topping up where needed.</td>
</tr>
<tr>
<td>LED(^{17})</td>
<td>High</td>
<td>Medium</td>
<td>LEDs use up to 85% less energy than older lighting and last for up to 25 years.</td>
</tr>
<tr>
<td>Integrated BMS(^{18})</td>
<td>High</td>
<td>High</td>
<td>Multi-sensor buildings management system. Allows continuous energy performance monitoring by building, floor or individual asset.</td>
</tr>
<tr>
<td>CCHP(^{19})</td>
<td>High</td>
<td>High</td>
<td>Tri-generators (CCHP) provide electricity, heat &amp; cooling efficiently. Can be run off biofuel for further carbon savings but are large, so not suitable for all offices.</td>
</tr>
<tr>
<td>Absorption chiller</td>
<td>High</td>
<td>High</td>
<td>Cooling system that uses waste heat from a CCHP (see above).</td>
</tr>
<tr>
<td>Variable speed drives</td>
<td>Medium</td>
<td>Medium</td>
<td>Controls that allow heating and cooling pumps and fans to operate at the speeds necessary to meet demand, avoiding over supply. Can be retrofitted.</td>
</tr>
<tr>
<td>Heat recovery</td>
<td>Medium</td>
<td>Medium</td>
<td>Collection and reuse of waste heat from heating, cooling and ventilation.</td>
</tr>
<tr>
<td>Modular boilers</td>
<td>Medium</td>
<td>Medium</td>
<td>Linked modules which can be controlled individually, replacing large single boilers. Increase flexibility and reduce oversupply of hot water.</td>
</tr>
<tr>
<td>Brise-soleil</td>
<td>Medium</td>
<td>Medium</td>
<td>Solar shading to reduce heat losses, and avoid excessive solar heating.</td>
</tr>
<tr>
<td>Voltage optimisation</td>
<td>Medium</td>
<td>Medium</td>
<td>Technology that stabilises the electricity supply at the optimal level for equipment, saving energy. Works best with older equipment.</td>
</tr>
<tr>
<td>Point-of-use taps</td>
<td>Low</td>
<td>Low</td>
<td>Water heaters at point of use that are more efficient than boilers or kettles. Only heat water when and in the amount needed and avoids distribution losses.</td>
</tr>
<tr>
<td>Smart lifts</td>
<td>Low</td>
<td>High</td>
<td>Programme that optimises lift journeys, based on destinations. Converts braking energy into electricity. Best suited to buildings with a bank of lifts.</td>
</tr>
<tr>
<td>Photovoltaics</td>
<td>Low</td>
<td>High</td>
<td>Solar panels which generate electricity on site. Requires adequate space and conditions to install and operate.</td>
</tr>
<tr>
<td>Solar thermal panels</td>
<td>Low</td>
<td>High</td>
<td>Solar panels which heat water. Adequate water temperature depends on solar conditions and distance to taps.</td>
</tr>
</tbody>
</table>

\(^{14}\) www.wbdg.org/resources/life-cycle-cost-analysis-lcca

\(^{15}\) Passive infrared sensor

\(^{16}\) Digital addressable lighting interface

\(^{17}\) Light-emitting diode

\(^{18}\) Building management system

\(^{19}\) Combined cooling, heat and power
If the cost of a technology is prohibitive but has great carbon reduction potential, we’ve sometimes been able to share part of the cost with suppliers or landlords interested in partnering with us to trial it. We’ve also been eligible for assistance through grants and other low carbon incentives for some options, too.

Before we invest in new technology, we look to make our own assessment of how well it is likely to perform in our buildings. In some cases, we’ve asked existing users about their experiences. But many of the technologies are unproven and so we need to test them ourselves to check we can achieve the benefits claimed.

This approach has given us the confidence to embrace some of the new solutions and turn away from others. We tried solar thermal panels in our More London office, for example, to supply hot water to our bathrooms. Unfortunately, however, the daily demand outstripped the heat available from the solar system and electric water heating was needed to obtain the desired temperature during business hours.

**Upgrading lighting**

With lighting representing around 40% of our energy consumption in 2007, it was one of the priorities and easiest areas for us to save electricity. At the time, LED was prohibitively expensive, so we started by upgrading our fluorescent lights with more energy-efficient models: we switched from T8s to T5s, producing a 60% reduction in energy consumption across our buildings - equivalent to £30 per fitting per year.

As the cost of LED lighting has dropped, though, we’ve begun to roll it out across our offices. LEDs reduce energy consumption by up to 85% when compared to our old fluorescent lighting and last up to 20 years longer, meaning drastically lower maintenance costs and waste.

**Improving lighting and heating controls**

Turning off lighting and heating out of hours had been our first step in reducing our energy consumption. But there were still times when our offices were only partially occupied and we were using more energy than needed.

So we invested in lighting and temperature controls to create independent zones on each floor. These allowed us to light, heat and cool the areas of the building on a needs-only basis, further reducing our energy consumption.

Initially we invested temperature sensors as well as daylight sensors and presence detectors, such as PIR. We’ve since gone a step further, investing in digital addressable lighting interface (DALI) systems which give monitoring and fully automated control of each lighting device from a central system.

Our building control systems allow us to tailor heating, ventilation and cooling operation to suit our specific occupancy times rather than switching the plant on and off at set times, therefore reducing energy wastage.

**Installing voltage optimisation**

This reduced the incoming mains voltage from 240v down to 220v (the EU standard voltage) lowering our electricity consumption. This meant our equipment could operate more efficiently, helping us see a reduction of around 7% in those buildings.

**Controlling motor speeds**

By installing variable-speed inverter-driven motors, we’ve been able to significantly reduce the electricity used for our heating and ventilation by up to 40%, compared to previous fixed-speed motors.

**Embracing cleaner fuels**

Alongside reducing our energy consumption, we’ve moved to cleaner fuels to help reduce our carbon footprint.

We installed tri-generators into our London offices which produce up to 25% of our buildings’ energy requirements. These not only generate electricity, heat and cooling efficiently, but they run on a biodiesel made from 100% used cooking oil, reducing both our carbon footprint and our dependency on the grid. They also integrate with absorption or adsorption chillers, reducing our energy requirements by using waste heat to produce chilled water which is then used for cooling.

**Generating hot water more efficiently**

We offer our people hot water so they can make drinks at work. Historically we provided kettles. But this was inefficient, both requiring a lot of energy and wasting people’s time as they waited for the kettle to boil.

So, we switched to point-of-use hot water systems in all of our offices, providing convenient, instant hot water. They heat water more efficiently, with less wastage, and use a lower wattage heating element (1,800W) compared to the 2,000W needed for a kettle, providing an overall carbon emissions reduction of around 10%.

We’ve also installed sensors in our washroom taps to avoid excessive water use, saving energy used to heat it.

**Investing in efficient office equipment**

With small power occupying 20% of our energy consumption in 2007, we made a concerted effort to adopt energy-saving solutions wherever possible and collaborated with our procurement team to include energy-efficiency as a buying criteria for new products.

For instance, we replaced our servers, laptops and other IT equipment with more energy-efficient models, and changed our hand dryers to air-blades which reduce drying time and energy consumption by up to 80%.

We’ve also consolidated equipment, introducing multi-functional devices (MFDs) and eliminating the need for separate printers, copiers and scanners. The MFDs not only save space but are more energy-efficient, switching to standby when not in use. Typically this saves between 20% and 60% energy, if it replaces one that is run during the whole working day or 24 hours a day, respectively.
Where to start?

It can be confusing to know where to start when looking to reduce energy and carbon emissions, as measurement of your baseline can be challenging, and there are so many different actions you could take. Every office is different, relying on different forms of energy, whilst carbon footprints change from country to country due to the energy mix of a given nation. Of course, starting with the most material impacts is best, even if this means using rough estimates of consumption levels or the associated greenhouse gases for your particular business. But how much might you expect to cut out, even once you’ve got a rough idea of your baseline?

Over the ten years that we’ve been acting on our carbon, we’ve got a feel for the reductions that can be delivered by specific actions. Whilst these are only indicative, they do give a sense of the magnitude of the savings possible, and may help to create some rough and ready businesses cases. To that end, we’ve set out (see Chart 6) a broad set of actions and the range of benefits that each might deliver, as a start point. You can then work with environmental and building engineers to get more accurate costings and feasibility analysis for your specific situation.

As you will see, there are lots of choices, and some are relatively easy switches. It’s also worth keeping an eye on the marketplace, as there are more and more low-carbon technologies and energy-efficiency solutions available, as carbon reduction becomes a mainstream business issue.

### Chart 6
Portfolio of possible actions to reduce carbon emissions with approximate relative and likely total impact

<table>
<thead>
<tr>
<th>Likely impact (on your total carbon emissions)</th>
<th>Potential carbon emissions saving (of each initiative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Operating differently, 100% (b)</td>
</tr>
<tr>
<td>Reduce floor space per person</td>
<td>Move to efficient buildings 30-70%</td>
</tr>
<tr>
<td>Use trigenerators</td>
<td>Design low carbon buildings 40-75% (a)</td>
</tr>
<tr>
<td>Install voltage optimisation</td>
<td>Upgrade from T8 to T5 lamps c. 60%</td>
</tr>
<tr>
<td>Install point-of-use hot water</td>
<td>Switch to airblade dryers c. 80% (k)</td>
</tr>
<tr>
<td>1°C Lower building temperature</td>
<td>Move to daytime cleaning 20-40% (g)</td>
</tr>
<tr>
<td>4°C Higher server room temperature</td>
<td>Maintain boiler controllers c. 40% (e)</td>
</tr>
<tr>
<td>0%</td>
<td>Introduce MFD printers 20-60% (j)</td>
</tr>
<tr>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Install voltage optimisation</td>
<td></td>
</tr>
<tr>
<td>c. 15%</td>
<td></td>
</tr>
<tr>
<td>c. 8%</td>
<td></td>
</tr>
<tr>
<td>c. 10%</td>
<td></td>
</tr>
<tr>
<td>c. 6-8%</td>
<td></td>
</tr>
<tr>
<td>c. 40%</td>
<td></td>
</tr>
<tr>
<td>c. 30%</td>
<td></td>
</tr>
<tr>
<td>c. 20-60%</td>
<td></td>
</tr>
<tr>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

**Key**
- Operating differently
- Harmonising our office space
- Refreshing our real estate
- Investing in new technology

**Potential carbon emissions saving (of each initiative)**

**Chart 6 footnotes**
- a) Compared to the same buildings before retrofitting, or typical, comparable buildings.
- b) e.g. Renewable Energy Guarantee of Origin (REGO) backed renewable electricity.
- c) Run on biodiesel and avoids distribution losses from grid electricity and gas.
- d) Typically installed alongside better lighting controls (e.g. Digital Addressable Lighting Interface, DALI).
- e) Run electric motors at their required rate rather than their full capacity.
- f) Lower voltage of grid electricity without impacting equipment performance. Applies to older buildings only.
- g) Cleaning and maintaining office space during working hours.
- h) Lower energy as boilers not running continuously whilst broken.
- i) Compared to standard kettles.
- j) Multi-Functional Devices (MFDs) compared to desktop printers.
- k) Compared to conventional hand dryers.
Taking people on the journey

There are lots of stakeholders who have a part to play in any carbon emissions reduction programme, including business leaders, suppliers, landlords (see right) and employees. In fact, acting on carbon delivers more than cost savings and reputational advantage, and we’ve seen that it also increases employee engagement and productivity.

Engaging employees

Doing the right thing for the environment matters to employees. They won’t necessarily explicitly tell you this on a regular basis, but surveys conducted in 2011 amongst our staff and partners revealed an expectation amongst 96% of them that we should be addressing our environmental issues. So we shared the story of our green buildings and the actions we’ve taken to reduce our carbon footprint, and have seen considerable benefits.

We track how well we’re doing against employee expectations in relation to our environmental responsibilities as part our Global People Survey each year. Over the period when we opened our award-winning green buildings, we saw the scores for this metric rise from 70% to 80% and they have stayed at around that level since. We also saw a noticeable uptick in the pride people felt in working for the firm, in their perception that PwC is a great place to work, and their intention to stay with us.

These results show that energy efficiency is not just about the cost of running office buildings: it also contributes positively to employee productivity, as well as reducing recruitment costs.

Working with landlords

PwC UK has a portfolio of buildings across the UK, some of which are fully controlled by us, and some that are landlord-controlled, particularly in cities where we have smaller numbers of employees, and may only need a floor or two, sharing the building with other companies. In landlord-controlled offices, there are different levels of influence: sometimes we control our area whilst the landlord controls the central plant, and sometimes the landlord oversees all the equipment including the fit-out in the PwC zones.

Building arrangements where you have little or no control make carbon footprint reductions more challenging but not impossible. Of course, we started with those buildings where we had full control – as it was easier to make a step change without having to get the landlord’s and other tenants’ approval, or to apportion any costs associated with it. Nevertheless, there are things you can do to reduce your carbon footprint even when you occupy multi-tenanted, leased buildings which are controlled by the landlord.

Isolate your part of the building

If you're likely to be in a landlord-controlled building for some time, you can still make improvements. Asking the landlord for meter readings for your area, or fitting your own automated meters to your part of the building allows you to measure your performance accurately, helping you to spot ways to reduce energy consumption through operational changes. They key here is to negotiate a company-specific energy or electricity agreement, so that you are only paying for the energy you're consuming and your business benefits from cost reductions as a result of your actions. It’s also important to get clarity about who is responsible for - and has permission for - maintenance, so that equipment can be fixed quickly to optimise consumption.

Energy reduction initiatives need to be those with shorter pay back periods and which are possible to do in your sphere of influence – such as consolidating floor space or making changes in your area (e.g. reducing the temperature, moving to daytime cleaning (so you can turn off lighting and heating earlier each day), installing multifunctional devices, upgrading your lighting, or installing point-of-use hot-water (see Chart 6 on page 20)).

Of course, you can always move to more efficient buildings, if landlords are uncooperative and you are not satisfied with the environmental improvements, when the lease comes up for renewal.
Travel: changing behaviours

Business travel is a significant contributor to our carbon emissions. Ten years ago it made up 46% of our total carbon footprint. By 2017 it was up to 82%, partly due to changes in carbon accounting\(^2\) but mostly because we drastically reduced our energy consumption over the period.

Challenging ourselves on the need for, the frequency of and the mode of travel has been a central part of our approach to reducing our carbon footprint. So in 2012, we set ourselves a target to hold our business travel carbon flat by 2017, against our 2007 baseline, whilst growing the business 50%.

Air travel was by far and away the largest component of our travel carbon, comprising both non client-facing and client-facing flights.

The non client-facing element is fully under our control and we’ve made great progress over the last ten years by limiting flights, encouraging alternatives to travel and promoting low-carbon travel: from a baseline where internal flights comprised just under half of our total air travel carbon footprint back in 2007, we’ve managed to cut the carbon from these flights by 88% so that it now only makes up 5% of our footprint from flights.

Reducing the client-facing element, however, is more challenging. It’s a complex issue as travel is important for building relationships which is at the core of our brand, and it’s also important in the delivery of our increasingly global services. Moreover, our clients have to be happy to work together in different ways, where we may have less time on site and less face-to-face time.

Nevertheless, we recognise that this is the largest component of our business travel and so have included all staff and partners in our sustainable behaviours programmes and sought to equip them with the knowledge, tools and incentives to make informed decisions about whether, when and how to travel for client work so they can get the best trade-off between service, time, cost and environmental impacts. Our 2017 results were really pleasing: we exceeded our target to hold our combined business travel carbon flat, reducing it by 4% against our 2007 baseline, and against a context of a c. 44% increase in business revenues.

Promoting online meetings, firm-wide

The simplest way to cut our travel carbon is to avoid it altogether by making better use of technology to connect to clients and colleagues. Online meetings are one of several collaborative technologies that we’ve invested in and have promoted to our people (see ‘Embracing online meetings’ on page 24, for more details). But the systems have to be easy to use and available wherever people work, for them to adopt them. So we installed online meeting software on all laptops and mobile phones, set up video-conferencing facilities in all of our UK offices, and upgraded from ISDN connectivity to faster Voice Over IP - providing a better user experience, whichever device was being used. This meant that everyone - whether client-facing or in the back office - had access to tools for collaborative working without the need to travel so much.

We’ve seen a fantastic uptake and have reported our progress in our Corporate Sustainability scorecard each year, using the number of online meetings per person as a lead indicator for reducing our business travel, as well as tracking our actual travel miles and carbon emissions.

Adopting stringent approvals for flights

In 2009, we introduced a strict approval process, requiring all of our people to gain senior management sign-off before taking any non client-facing flights. Whilst an approval process doesn’t prevent flying, it does help to challenge people to think about whether they really need to travel, and was extremely effective in reducing trips, almost immediately. The process was reinforced in 2012, just to ensure it was still front of mind and being applied across the business, coupling it with the availability of online meeting tools as an alternative.

The other helpful lever to reduce carbon emissions, is a strong policy around class of travel. We require our people to book economy class for journeys under three hours, and staff are encouraged to travel economy class for all flights, reducing both the climate impact and cost of our travel.

Addressing the need for and the mode of travel has helped us decouple our travel carbon from our business growth.

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\(^2\) During this period the science around emissions associated with air travel, particularly the impact of radiative forcing, increased the per kilometre CO\(_2\)e for the emissions factors relevant to us by 153%.
people to reach us by public transport and for us to travel out to clients by train, too. On the other hand, as we’ve developed our offices, we’ve deliberately chosen not to provide parking facilities, to discourage the use of cars. (Where we have installed a limited number of parking bays, they are dedicated to disabled access, to support social inclusion, and have charging points to encourage the adoption of electric vehicles).

Meanwhile, we’ve made it pleasant for people to opt for trains when on business trips. We allow managers and above to travel first class within the UK on journeys over an hour if there is a business need, and Business Premier class on the Eurostar, to reduce domestic and short-haul flights.

And, although not part of our business travel carbon, we have an eye on our commuting carbon footprint. We offer all permanent employees the option to apply for an interest-free season rail ticket loan facility, allowing them to pay for the ticket in monthly instalments rather than as a large annual sum.

Towards low carbon cars
If our people have to travel by car, we encourage them to consider the most sustainable way to drive. We provide them with information on choosing fuel-efficient and low-carbon cars, driving efficiently and car-sharing.

In 2011, we launched a pilot to learn how electric vehicles could help us reduce our carbon footprint. The cars were used by our people to replace taxi rides to get to locations that might be more difficult by public transport, and was aimed at reducing our carbon emissions and costs. The trial ran for three years in both London and Birmingham – our largest office outside the capital - and helped inform our decision to include electric cars within our car lease scheme.

As regulation and innovation have driven improvements in the carbon footprint of cars available in the marketplace, we’ve refreshed our car lease scheme interface so that environmental issues are front of mind when our people are choosing a vehicle. On the home page, for instance, we’ve included a series of ‘green’ cars (hybrid and electric) as ‘hot picks’. This has helped to reduce our business travel carbon footprint: over the past ten years, the average carbon per kilometre of our employee car fleet has dropped from 140g/km to 105g/km, a reduction of 25%.

Engaging our clients
Each client engagement is different and we didn’t want to prescribe strict travel rules which might jeopardise the quality of our work. However, we did encourage our people to discuss with their clients how they could reduce travel associated with their engagements by considering which trips were necessary and which could be avoided.

We also developed a carbon calculator to estimate project-based footprints, making it easier to estimate the level of carbon reduction that could be made by streamlining travel to and from the client site. Through this process, we learnt that certain type of meetings are easier to do remotely than others, such as regular status updates, for example.

Educating our people
Throughout the ten year period in review, we’ve consistently communicated to our people about the need to focus on reducing their travel carbon impacts, as well as educating them about the issue of climate change, although not always together, as you’ll see below.

Our first attempt was the introduction of individual carbon statements for our top few hundred fliers. The intention was that they would see how they compared against their peers and opt for more sustainable behaviours, accordingly. But, in practice, little changed as people felt that the travel was necessary to deliver good client service.

Instead, we tried programmes which focussed on stronger business benefits, such as the online meetings campaign. These have received much greater traction with our people, and been effective when combined with tighter travel approvals, both for back office and client-facing staff.

Meanwhile, throughout the last five years, we’ve raised the profile of climate change to our people in as many appropriate channels and initiatives as possible: it featured in a sustainability training module completed by 94% of our workforce; we’ve highlighted it regularly as part of our permission-based sustainability marketing programme – which reaches over 4,000 of our people twice a month; and we’ve integrated it into our firm-wide communications about our new buildings, our annual sustainability performance and our environmental volunteering. We even ran a ‘PwC Climate Week’, to raise awareness of and encourage personal action in support of the climate discussions in Paris, in 2015. Of course, in recent years, it’s been profiled as one of the Sustainable Development Goals, as well as being the focus of research undertaken by PwC, Stanford University and the World Economic Forum on how technology can help solve global environmental problems.

Taken together, these initiatives have increased the overall awareness of and desire to take action to address climate change amongst our people, creating a more receptive context into which our travel-specific messages land and helping to increase behaviour change. Whilst it’s hard to tease out the relative contribution of each action to our overall result, what we can say is that, in total, raising awareness of the topic has helped us to decouple our travel carbon emissions from our business growth and reduce our travel carbon by 4% in absolute terms over the last ten years.
Embracing online meetings

Designing the campaign concept: When we first started to promote online meetings as an alternative to travel, take-up was extremely low. Our business had a culture of face-to-face meetings, and almost two thirds of our people had never arranged an online meeting for work, in spite of using similar technologies with family and friends. In fact, many believed online meetings were only suitable for internal use, rather than connecting to clients.

We quickly realised that we needed nothing short of culture change to be successful, and that our campaign would need longevity. Over more than five years, we developed several concepts that could be adapted for multiple phases, keeping the messaging alive and fresh during each stage of adoption – trial, frequency, advocacy.

Our initial campaign sought to engage our people about online meetings at a personal level. It highlighted the wellbeing benefits of travelling less with the strapline, “Online meetings. Because you’ve better things to do” and contrasting pain points (such as airport check-in queues and pat-downs) with time at the gym or with family. It had limited success, however, because it was working ‘against the grain’ - suggesting people spend less time with their clients.

We had a rethink and developed a second campaign which showed how online meetings could help our people to connect more often with clients. This campaign was hugely popular. Upbeat in tone, and using witty, eye-catching titles, we released one part of the story each quarter (see images, right) – all the while linking online meetings to a clear business benefit, of building strong relationships.

In a third phase, we focussed on raising awareness of all the ways online meeting tools can be used to collaborate, in a campaign called “Online meetings. Bring your calls to life” and using animals to explain the functionality of the software.

Getting noticed: To achieve high impact, we launched across multiple channels in every one of our offices on the same day - something that had never previously happened in the firm. To stand out from the crowd, we made creative use of simple, bold colours and typeface, while remaining true to our brand.

A strong physical presence in our offices was matched across digital channels, including the hotelling kiosks our people use to book a desk in the morning, our network of office plasma screens, emails and a dedicated website.

Developing the right skills: We knew that awareness alone wasn’t going to be enough, however, especially as our people perceived online meetings to be complex and unreliable. So, we developed a set of resources to make it as easy as possible for people to trial the software, challenging and reversing their perceptions. These included:

- A series of short, online demos, accessible from a campaign microsite
- Downloadable user guides
- Weekly, online, drop-in ‘surgeries’ called ‘WebEx Wednesdays’ to offer bespoke support
- Dedicated training for the secretarial teams, especially those supporting senior executives who could role-model the new behaviours we were hoping to instil.

Changed behaviours: Our campaigns have delivered a fundamental shift amongst our people. They’ve helped unblock a deep-rooted scepticism about technology, creating positive associations and doubling the number of our people who feel it has a role to play in helping us to collaborate with each other, and with our clients.

The last sustainability survey conducted amongst our people showed 79% now feel online meetings are appropriate to use on client engagements (versus 36% a few years before), and 78% now feel confident using the technology. Moreover, over ten years, we’ve gone from only one online meeting being set up per year for every seven of our people, to each person in the business setting up more than seven online meetings a year – nearly a 5,000% increase.

All in all, it’s clear to see that our business travel carbon emissions reduction would not have been possible without this programme.
Further carbon reduction initiatives

In addition to energy and travel management, we’ve put in place a few other initiatives which have helped to reduce our total, operational carbon emissions.

Material consumption
When we calculated our greenhouse gas footprint in 2007, there was no guidance from Defra on emissions related to the materials used by our business, so it did not appear in our total (see Chart 4 on page 8). This has since changed and we now include it in our reporting. In 2017, in total, material consumption accounted for just over 5% of our total carbon emissions so it’s a relatively small part. Nonetheless, we’ve taken steps to address it, as part of being a responsible business and pioneering new, more sustainable ways of working.

One of our main priorities in material terms has been the paper we use in our offices and we’ve run a number of initiatives over the years which have helped us drastically reduce the amount of paper we use. In fact, this year, it was 64% less than in 2007, which we estimate has saved us £3.9m in costs.

We largely achieved this by removing all the desktop printers and replacing them with multifunctional devices that have default double-sided printing, as well as transitioning to more digital ways of working, including signing and storing legal documents electronically. Moreover, we’ve also reduced our carbon footprint and material impacts by procuring recycled paper. Achieving the top rating in the WWF Environmental Paper Company Index, our office paper now comes from a state-of-the-art facility which takes our confidential paper waste and can recycle it twenty times – three times more than traditional paper recycling.

We’ve also made several changes to reduce water consumption in our buildings, such as installing waterless urinals and better condenser water systems across our real estate. Since 2007, we’ve cut consumption by 40%.

Waste
We’ve measured the carbon footprint of our waste since 2010, when Defra first provided guidance on it. We estimate that, at that time, it accounted for 7% of our total carbon footprint.

Having considerably reduced the amount of waste we produce and having achieved ‘zero waste to landfill’ since 2012, our focus for the past five years has been on working towards 100% reuse or recycling, shifting away from incineration (see www.pwc.co.uk/goingcircular).

In 2017, we sent 86% of our practice floor waste to reuse or recycling, and had reduced our waste volume by 46%, just shy of our -50% target. These changes, together with revisions in the carbon conversion factors published by Defra, mean that today waste represents only 0.21% of our total carbon footprint.

Carbon neutral
We’ve offset all our greenhouse gas emissions as reported at the end of each year since 2007 to achieve carbon neutrality, buying carbon credits that are certified under recognised standards (REDD+, CCB and VCS). This ensures that our carbon credits are real, measurable, additional, permanent, independently verified, unique and traceable, with a transparent chain of custody, from issuance through to retirement - and that we are doing everything we can to act on carbon.
Want more details?

For information on our low carbon economy work for clients, please visit [www.pwc.co.uk/services/sustainability-climate-change.html](http://www.pwc.co.uk/services/sustainability-climate-change.html).

For more on our overall corporate sustainability agenda, visit [www.pwc.co.uk/corporatesustainability](http://www.pwc.co.uk/corporatesustainability).

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