

# How Green is our Digital?

Local government, urban and rural digital infrastructure and sustainability today





# Contents

## Foreword

1.	Twofold focus	<u>04</u>
2.	Global issue with a local focus	<u>06</u>
3.	Local and regional response	<u>08</u>
4.	How green is our digital today?	<u>10</u>
5.	Digital and data make a difference	<u>12</u>
6.	Microsoft and carbon neutrality	<u>20</u>
7.	Local and regional priority	<u>25</u>

---

**UKAuthority**



This white paper has been researched, written and published by UKAuthority thanks to support from Microsoft UK.

Authors: Mark Say & Helen Olsen Bedford, UKAuthority

For further information contact:

- Helen Olsen Bedford, Research Director, UKAuthority:  
[helen@ukauthority.co.uk](mailto:helen@ukauthority.co.uk)
- Ellen Wilson, Industry Solutions Executive Local & Regional Government,  
Microsoft: [elwilson@microsoft.com](mailto:elwilson@microsoft.com)

# Foreword

## Technology's contribution to the green agenda in local and regional government

**T**hanks to inspirational activists such as Greta Thunberg and a growing global movement, sustainability and countering the climate crisis is at the top of everyone's agendas.

Public authorities are responding to the concerns of their staff and citizens and increasingly acknowledging their responsibilities when it comes to sustainability and carbon neutrality. And they are beginning to look for innovative solutions to improve both sustainability and the quality of life of their citizens.

Many local authorities, for example, have declared a climate emergency and announced proactive initiatives. However, there is no single solution: rather, there are multiple elements to sustainability and it is a factor that must be taken into account in a wide range of public services and responsibilities.

It also requires embedding sustainability into broader digital transformation and efficiency strategies. Indeed, the two should go hand-in-hand, with factors for each feeding into the major decisions on the other. It will take a combination of innovation and a commitment to using evidence from the data – with the political will to push through radical changes in an organisation's operations and policies.

### Commitment to sustainability

**Microsoft is heavily committed to sustainability, both in the way it runs its own business and in its engagement with partners and customers.**

Since 2012 our operations have been carbon neutral - due largely to an internal carbon tax that funds reductions, clean energy and offset projects.

However, in an important move for all of us who work at Microsoft, in January 2020 we announced [our commitment as a global company to become carbon negative by 2030](#)<sup>1</sup> – and to remove all the carbon

emitted directly or by electrical consumption since Microsoft's beginnings in 1975.

We will move to 100% use of renewable energy by 2025 and use only electric vehicles on global campus operations by 2030. From next year, carbon reduction will be an explicit aspect of our procurement processes and, via a \$1 billion investment fund, we will accelerate development of new carbon reduction and removal technology.

But we also place a premium on supporting the sustainability of our customers, with those in local and regional government and the wider public sector figuring prominently. We are a founder member of [Defra's e-Sustainability Alliance](#)<sup>2</sup> and aim to provide sustainable tools and technology for our public sector customers to use.

Our cloud services are up to 93% more energy efficient and 98% [more carbon efficient than traditional enterprise data centres](#)<sup>3</sup>. But beyond this is a growing range of innovative solutions emerging from our partners, many of them built on the Azure cloud - the capabilities of which are increasing daily with the expansion of IoT and advances in machine learning and AI.

This report explores how green public sector technology is today and how our partners and authorities are harnessing technology to deliver not just efficiency, but sustainability. I hope that you find inspiration and ideas in these pages to help your organisation on its own journey - playing its part to solve this climate crisis facing us all.



**Chris Perkins, General Manager Public Sector, Microsoft UK**

1. <https://news.microsoft.com/climate/>

2. <https://defradesa.blog.gov.uk/2019/12/17/defra-launches-new-coalition-championing-green-it/>

3. <https://www.microsoft.com/en-us/corporate-responsibility/sustainability>





# 1. Twofold focus

Environmental sustainability is a major issue in all walks of life, not least in the delivery of public services

**F**ollowing a rise in public awareness during 2019, an increasing number of local public authorities are now formally recognising the dangers of climate change and committing themselves to take action to cut back on energy consumption, reduce their carbon footprints, make more efficient use of water and contribute to improving air quality and the environment for their citizens.

There is also a growing appreciation that digital technology can play a major part in this effort, although most organisations are still in the very early stages of harnessing its potential. Many of the existing initiatives are focused on experimentation, pilots and providing exemplars for the public sector. Public authorities are just beginning to find their way in using digital tech to improve sustainability.

Along with this is an appreciation that much of the effort will have to be focused at a local and regional level. On one hand, the public sector front line accounts for a large share of overall public service delivery, which means a large share of energy usage and consumption of digital hardware and infrastructure. On the other, it has a major influence over the environmental landscape, with local and regional authorities responsible for transport, roads, planning permissions, public health initiatives and the running of schools. They also have to work closely with utilities and infrastructure providers, ensuring that their plans will not harm the local environment.

## Front line sustainability

**Local and regional government will be a major contributor to the public sector’s effort to build a sustainable future for the UK.**

Success will involve a twofold focus of the effort. One is in the use of digital equipment and services, with

the aim of sharply reducing energy consumption, extending life cycles and encouraging recycling and re-use. This is in line with the [Greening government: sustainable technology strategy 2020<sup>3</sup>](#), which sets out how government should carry out procurement in a sustainable way to meet green commitments. It is about internal improvements and can be closely aligned to the efficiency agenda, contributing to the way local authorities work to make themselves financially and operationally sustainable long term.

There is a widespread acceptance of the underlying principle, but it comes with complexities and organisations have limited knowledge on how to get the most from their equipment and services. They are still learning about how to put this principle into practice.

## Data and digital

**The other strand involves the use of technology and data – taking advantage of advanced analytics, machine learning and artificial intelligence (AI) – to support broader sustainability efforts, particularly in the building of a green critical urban and rural infrastructure.**

The emergence of the internet of things (IoT) and increasingly sophisticated data systems provides the scope for a more detailed and forward-looking approach to local government’s role in transport, buildings, public infrastructure and even farming.

Methods are being developed to help understand the environmental implications of all types of decisions, and authorities need to take advantage of the opportunities to use these insights and develop a more holistic approach to their work in the field. The plethora of new possibilities stemming from data are going to play a crucial role in promoting sustainability.

CONTENTS

CONTENTS

3. <https://www.gov.uk/government/publications/greening-government-sustainable-technology-strategy-2020>

Some councils and regional authorities are actively exploring these possibilities, while others are placing them among their priorities for the next few years. Among their technology and data options are a wide range of solutions developed by Microsoft partners to support the effort.

## Carbon neutral cloud

**The company provides some of the core technology to support this sustainability drive, most notably with Microsoft Azure offering a robust and carbon neutral platform for third party services running in the cloud.**

Plenty of companies are using it as a foundation for solutions to many of the environmental challenges within public services. In addition, products such as Power BI and Office 365 can be used to provide a series of modern workplace benefits – incremental on a day-to-day basis, but massive when accumulated – that help an authority reduce its environmental footprint.

Authorities can benefit from looking closely at these options, and more importantly from embedding

### Your Microsoft Industry Solutions Executives in local & regional government:

Ellen Wilson  
[elwilson@microsoft.com](mailto:elwilson@microsoft.com)

Helena Zaum  
[hezaum@microsoft.com](mailto:hezaum@microsoft.com)



the need for sustainability in their wider plans for digital technology. The fact is that sustainability and transformation will have to go hand-in-hand – and local and regional government has as big a role to play as Whitehall.

The following pages examine the major factors at work and look at some of the innovative solutions and services developed by Microsoft partners to support the campaign.



CONTENTS

CONTENTS



## 2. Global issue with a local focus

From Greta Thunberg to the United Nations, our impact on our environment gains ever more prominence

**Sustainability is now high on the international political agenda, with the United Nations having declared [17 sustainable development goals for the year 2030](#)<sup>4</sup>.**

They place an emphasis not just on environmental issues, but social justice and an overall improvement in the lives of the world's poorest populations:

- No poverty
- Zero hunger
- Good health and wellbeing
- Quality education
- Gender equality
- Clean water and sanitation
- Affordable and clean energy
- Decent work and economic growth
- Industry, innovation and infrastructure
- Reduced inequality
- Sustainable cities and communities
- Responsible consumption and production
- Climate action
- Life below water
- Life on land
- Strong institutions for peace and justice
- Partnerships to achieve the goal

Digital applications can play a significant role in achieving many of these goals, with the promise to support the natural environment increasing with the development of sensors, satellite imagery and increasingly sophisticated data tools.

Local government has a direct stake in helping to achieve some of the goals, especially for the creation of sustainable cities and life on land, and a secondary but still significant role for most of the others.

UK government has been taking the issue seriously for several years, acknowledging that digital technology can be a major contributor to environmental problems, and that it has a responsibility for reducing the effects in its own operations.

### Defra lead in public sector

**Central government has had a green ICT strategy since 2011, with the most [recent version covering the years 2018-20](#)<sup>5</sup> under the leadership of the Department for Environment, Food and Rural Affairs (Defra).**

It emphasises that the move to cloud based, commodity, re-useable and digital by default services provides opportunities for greener ICT and to use technology in making operations more sustainable overall. It also bases itself on a handful of principles:

- Minimising waste and embracing circular economy concepts
- Using resources more sustainably and efficiently
- Promoting social, legal and ethical ICT
- Mitigating and adapting to climate change and supply chain risks
- Life cycle analysis and whole life costing
- Seeking innovation opportunities

While the document was written primarily for central government, it has a strong relevance to local and regional government and the principles are influencing the thinking of many authorities.

Defra is also producing annual reports on sustainable technology in government. The most recent, which

CONTENTS

CONTENTS

4. <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

5. <https://www.gov.uk/government/publications/greening-government-sustainable-technology-strategy-2020/the-greening-government-sustainable-technology-strategy-2020-sustainable-technology-for-sustainable-government>

6. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/837733/star-ict-annual-report-2018-2019a.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/837733/star-ict-annual-report-2018-2019a.pdf)



appeared in [October 2019](#)<sup>6</sup>, says that the ICT estate on government property has become more energy efficient as departments have moved into service provisions driven by 'cloud first' and digital policies. There has also been progress in reducing ICT waste with only 0.8% from the reporting organisations going to landfill over the previous year.

In addition, in October 2019 Defra created the e-Sustainability Alliance, bringing together policy makers with businesses, non-government organisations and academia in an effort towards making the ICT sector more sustainable. It has already published an [industry guide to green ICT](#)<sup>7</sup>, which provides an overview of the key challenges and guidance on best practice for ICT managers and architects, manufacturers, disposers, recyclers and users. This all draws on the UN goals and [Defra's 25 Year Environment Plan](#)<sup>8</sup>.

## Climate crisis

**S**ixteen year old Swedish environmental activist, Greta Thunberg, urged immediate action to address a global climate crisis during 2019. Her call started a global movement putting climate and sustainability at the top of political agendas worldwide. She was named Time magazine's person of the year for 2019 – the youngest person ever to receive the accolade.



7. <https://www.gov.uk/government/publications/sustainability-in-information-and-communication-technology-ict-a-defra-guide>

8. <https://www.gov.uk/government/publications/25-year-environment-plan>



# 3. Local and regional response

Authorities across the country have a role to play

**The vast majority of local and regional authorities recognise that they have a significant role to play in an issue that is of growing concern to their citizens.**

Plenty have formally acknowledged the dangers of climate change and committed to taking action in response. This reflects some of the findings in a survey of [public attitudes by Deloitte](#)<sup>9</sup>, which found that 66% of respondents thought that government could do more to provide information on how they could live in an environmentally friendly way, and 69% wanted more options to help them do so, such as on public transport or in better insulated homes.

Their approach has generally been through steps such as reducing traffic congestion, improving green spaces and encouraging the use of sustainable energy sources. The West Midlands Combined Authority (WMCA) provides one of the more comprehensive examples, with a [Sustainability Roadmap to 2030](#)<sup>10</sup> with several areas of focus: resource efficiency; clean and active travel; clean air and water; natural environment; sustainable growth; social equity and health; sustainable energy use; and adapting to climate change.



Some have related this directly to digital technology. Regional bodies such as the WMCA and [Greater London Authority](#)<sup>11</sup> have environment or sustainability strategies that

include using smart technology to reduce energy consumption and improve air quality. Smaller authorities have strategies that include references to the use of ICT and digital: [Brighton and Hove](#)<sup>12</sup> says the management of the ICT infrastructure is important in reducing the carbon footprint; and Lincolnshire includes automatic metering in council and school buildings to provide half hourly data on energy consumption.

But it is difficult to find examples of councils including their own use of ICT in these strategies, or outlining a detailed plan for making fuller use of digital and data in the cause. This could reflect the backdrop of years of pressures on local government, including the pace of change and transformation, a severe and continued squeeze on budgets, the emphasis on diverting available funds to support the most vulnerable, and the increasing demand on adult social care services from an ageing population.

Against this, however, is the knowledge that it has to devote more resources to preventing problems, and that supporting the environmental agenda is a significant element of this. There is a rising appreciation of the need to build sustainable communities, including an emphasis on more energy-efficient homes and public buildings, better transport and cleaner air. Much of this revolves around a focus on using technology in smart places. This can involve measures such as combining better street lighting with IoT sensors, using sensors to create more dynamic and effective buildings, technology for better waste collection, street management and flood protection, and the use of digital twins in planning.

All this creates the need for an alignment of sustainability and digital strategies to fully exploit the potential.

9. <https://www2.deloitte.com/uk/en/pages/public-sector/articles/the-citizen-view.html>

10. <https://www.sustainabilitywestmidlands.org.uk/roadmap-to-2030/>

11. [https://www.london.gov.uk/sites/default/files/les\\_executive\\_summary\\_0.pdf](https://www.london.gov.uk/sites/default/files/les_executive_summary_0.pdf)

12. <https://www.brighton-hove.gov.uk/content/environment/sustainability-city/reducing-our-carbon-emissions>

CONTENTS

CONTENTS





# Smart Cambridge uses IoT to drive sustainability agenda

**C**ambridge is not alone among local authorities in its road transport challenges, with the need to improve the experience of cyclists and pedestrians, as well as reducing dependence on private cars and controlling the impact of delivery vehicles.

When a major road artery has to be closed, substantial planning is needed to minimise the knock-on impacts. In this case there is a short term tactical need to understand 'before' and 'after' traffic patterns, but the involvement of the Smart Cambridge team – the smart city body for the region – with the Urban Data Project (UDP) also looks to long term benefits around a more sustainable city.

UDP is a consortium of technology providers including Microsoft, Telensa and Kainos working with Smart Cambridge to pilot a new approach to collecting data about public spaces.

Telensa's lamppost mounted multi-sensor pods collect data on a street by fusing information from cameras, radar, noise level monitors, pollution detectors and other sensors, and applying AI on the device to create a digital twin of the street. Data is securely transmitted to the City Data Guardian platform – based on Azure – where analytics can be run on traffic and pedestrian patterns across an entire city.

Microsoft partner Kainos is leveraging Azure technologies such as IoT Hub and Databricks to create the platform, which couples data processing with a trust engine. It provides chief data officers with a simple interface to protect privacy and control access to the data, and publishes the detailed data policy to ensure full transparency for citizens.

While the solution is in a pilot phase at present, its fine grained and comprehensive data coverage means that the potential to create

a greener city is immense. Typical use cases include bus route planning, virtual cycle lanes, low emission zone enforcement, junction optimisation and last mile solutions. The effectiveness of city interventions on noise and air quality can be monitored, especially when measuring the impact of major construction projects.

UDP is part of an evolving sustainable Cambridge story, including Telensa's Planet platform, which controls the city's LED street lighting for a significantly reduced carbon footprint.

Dan Clarke from Smart Cambridge says: "Cambridge is trialling and deploying smart technologies, and the Urban Data Project is part of our innovative approach. By providing us with the tools to collect and use data responsibly, we now have an opportunity for the real use of IoT technology to improve and deliver more efficient city services while being transparent to our residents.

"Creating a comprehensive 'digital twin' illustrates how collaboration and technology can improve not only quality of life and economic strength of our area, but also the sustainability of our city."

<https://urbandataproject.org>

CONTENTS

CONTENTS





# 4. How green is our digital today?

We asked local authorities how aligned their digital and sustainability strategies are today and their thoughts on its importance tomorrow

**R**esults of a survey conducted amongst local authorities as part of the research for this paper leave little doubt that local government is taking the issue of sustainability very seriously.

Of 165 respondents from local authorities almost all said they believed it had become an issue with their citizens: ranking it from one to five in importance only 1% placed it at the lower levels of one and two, with 23% placing it at three, 38% at four and 35% at five.

**A majority of councils are taking some type of action**, with 60% having declared a climate emergency and 48% having appointed a sustainability officer (with 18% saying they did not know for sure).

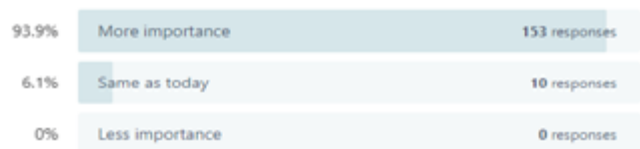
**There were also signs of the issue beginning to have a significant influence on ICT procurement**, with 93% saying they believed it would become more important over the next five years. Apparently, it is a movement that is in the early stages of building momentum: fewer were ready to respond to the question of what percentage of ICT tender requirements currently relate to sustainability (119 of the 165), and the ratings were relatively low. Just 13% of respondents said it would be 10% or more, and a disappointing 16% ranked it at zero, suggesting it is still on the back burner at some councils.

**A strong consensus emerged around the technology options and issues that they thought could be used to reduce their councils' carbon footprints:** with 95% seeing it in more mobile working and the use of virtual meetings; 90% in the efficiency of buildings; 89% in smart travel; 86% in better energy management; 80% in waste management; and 66% in making more of sustainability considerations in planning.

Comments from the respondents also showed an appreciation of the broad issue of using technology to provide solutions for sustainability, and a belief that the public sector has a leadership role to play.

"Be crystal clear from the local authority perspective about what they can influence at local level and enable us to work from the ground up," was one comment.

How much importance will your council place on sustainability in procurement and management of its technology in five years' time compared to today?



But there were also warnings, with a handful pointing out that ICT brings its own carbon footprint which, if not carefully managed, could undermine the efforts in other areas. Some pointed to the high energy data centres, and one commented that: "The insatiable appetite for processing power and online storage needs to be kept in check". It points to the need for a commitment to green ICT and the right balance between its own energy consumption and savings elsewhere.

Similarly, there were a couple of warnings about the need to look at the sustainability impacts along the whole supply chain of technology.

**Several emphasised the importance of data in making it possible to manage all this effectively, with one highlighting the need for a data capability to provide "a system-wide assessment of sustainability"**. This comes with a view that at the moment sustainability considerations are largely taken within silos, and it needs a wider perspective on how they relate to each other to address the issue most effectively.

In which areas do you think technology can be used to reduce your Council's carbon footprint?



CONTENTS

CONTENTS

# Building a modern workplace culture

It is easy to underestimate the environmental benefits that can be obtained through using a productivity tool such as Microsoft Office 365.

The software suite provides an outstanding asset for sustainability in helping organisations to cut the amount of travelling by their employees, whether it is for internal meetings or collaborative working with partner organisations. Microsoft Teams can reduce fuel consumption and the carbon footprint for those using private vehicles, and provide significant cost savings in the use of public transport – and take some pressure off the public demand for buses and trains.

The ability to harness Teams for virtual meetings and collaboration tools such as OneDrive, OneNote and Sharepoint enables people to run even complex projects from their own office. It can also enable employees to do a lot more remotely while out in the field; a great asset for public staff such as those in social care working in their communities.

But in plenty of organisations there has been a cultural resistance to breaking away from the habits of travelling to meetings or going back and forth from office to client visit. This is where change management consultancy Hable has been helping a range of public authorities to create a new mindset for their staff that encourages them into fully exploring and utilising Office 365.

The company works with organisations on embedding psychological buy-in from their employees with workshops focused on the issues that cause them the most worries. For example, it has found that in local government the largest issue is social care – reflecting its cost and political sensitivity – and works on relating the demands of the job to the capabilities of the software suite.

It focuses on how people work, identifying the inefficiencies and problems current practice may create. In social care this invariably revolves around the dependence on pen and paper and continual travelling from home visits to the office to record information. It then shows how the problems can be solved by utilising Office 365, highlighting the details



that people often see as barriers. For example, they are happier with pens than keyboards; but the software can work on a tablet computer with notes made by a digital pen.

Generally the organisations already have the technology they need available but are not using it to its full potential. This is where the explanations, followed up by short training sessions, can show the advantages in a new approach.

The company also aims to ensure there is a strong degree of co-creation in the process, with people providing their own input into how to use the technology, to overcome the barriers. The key is often in showing that fears are unfounded and that the change can make their working lives easier, save a lot of time and help them to provide a better service for the public. This can be particularly effective in winning over middle management - which is where the resistance to change is often strongest.

The call to action is for government bodies to look at their departments that have the largest inefficiencies in travel, look at the cultural factors that are contributing to this, then bring the middle managers on board early to highlight the problems and co-develop solutions. It is a case of changing the mindset to make work better and support sustainability.

<https://www.hable.co.uk/government>





# 5. Digital and data make a difference

Authorities are exploring how technology can support and deliver sustainability

**T**here are several ways in which digital tech can support the effort for sustainability, ranging from simple methods to reduce the need for travel to a deep dive data analysis into the long term implications of planning decisions.

At the most basic level, the capacity to support mobile and flexible working can make a big difference. Cloud systems and mobile devices are becoming ubiquitous, backed up by increasingly robust fibre broadband and wireless networks - this potential will be boosted further with the roll out of 5G in the next few years. This is enabling many local government employees to do as much in their homes or out in their communities as they do in the office.

## Modernising the workplace

Productivity suites such as Office 365 now have a wide range of capabilities for sharing and amending files and presentations, and to support conversations between people in different locations.

The use of email has become second nature for most people, but many are now learning to make the most of other tools. The expanding functionality of Microsoft Teams – one of the core features of Office 365 – is enabling people to hold full scale meetings in which they can talk face-to-face, hold text chats, collaborate in multi-disciplinary teams and integrate the system with a wide range of applications. This is removing the need for travel, so people can hold productive conversations with others in distant locations and work as one around citizens’ needs.

Add to this a plethora of line of business systems that work efficiently on mobile networks and it amounts to major savings in time, travelling, energy consumption and carbon emissions. It is all fuelling a gradual change in the working culture towards one in which remote meetings and access to systems and

documents are the norm; and while the difference will be tiny for individual instances, the cumulative effect will be a big reduction in travel. Beyond saving journeys between offices, the big difference is in enabling people to spend more time working from home, thereby reducing the environmental consequences of the daily commute.

It is reflected in the fact that the digital strategies of almost every local authority now include an emphasis on increasing mobile and flexible working.

## Recycling and the circular economy

Next comes the piece on the recycling and re-use of ICT equipment. Hardware refreshes are still a fact of life in using digital tech, as new applications and cloud services demand increases in processing capacity and memory.

But there is now a strong sense that simply confining equipment to landfill is not permissible, and there have to be efforts to enable its re-use for less demanding purposes, or to dismantle it in a way that



CONTENTS

CONTENTS

# Measuring the benefits of recycling and re-use

One of the big factors in the environmental footprint of digital technology is the relatively short life cycle of much of the hardware. For every device replaced there is an extra footprint in the production and shipping process of the new one, and this adds up to a big impact in the use of resources, energy and the effects of industrial processes.

Extending that life cycle can be a big gain for the environment; and that can apply to the materials as much as to the manufactured devices. Gold, platinum, rare earths, aluminium and tin are often found in e-waste, and the responsible approach is to find better ways of recovering the elements.

This has been recognised within government, notably by the creation of Defra e-Sustainability Alliance (DeSA) in October 2019, bringing together a group of major technology companies with non-government organisations, academics and policy makers to make the UK ICT sector more sustainable. It has published an industry guide to sustainable ICT, detailing how organisations can use it to align their work with [sustainable development goals](#)<sup>1</sup>.

The cause could be helped by reliable data on the benefits of adopting best practice. Among the members of the alliance is professional services company, N2S. It is a DeSA member that specialises in the field and has developed a sustainable development goals dashboard to calculate and demonstrate savings on energy usage, carbon and water.

Its further development depends partly on input from the major technology providers; some are good at reporting on embodied carbon footprints in their processes, others less so. But pressure to provide reliable figures is rising and there is a body of evidence from third party research on the water and carbon footprints from manufacturing.

The company is using this data to develop algorithms that can estimate the carbon and water savings from extending the life of the equipment and enabling re-use over recycle in the hierarchy of outcomes for unwanted IT. Given that government is the largest single buyer in the UK, if more of its organisations

cooperate it will do a lot to provide meaningful data.

In turn, this could support the development of standards

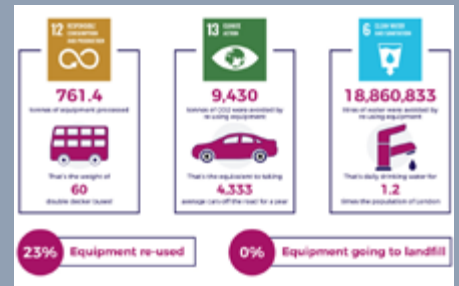
for ICT procurement in the public sector, setting requirements for any manufacturers to report on the embodied carbon footprint, and helping organisations to establish the gains from re-use cycles. It requires standardisation on how the measurements are taken, what manufacturers are asked to provide and a hierarchy of outcomes on the savings. This is a stiff task, but it raises the promise of using solid data to provide guidance and embed sustainability best practice into the culture and governance of organisations.

N2S has been advocating the cause of a 'circular economy' of ICT equipment through encouraging resale and re-use and developing environmentally friendly processes for extracting rare and precious metals from redundant technology. This has led it into a project with Coventry University – backed by Innovate UK under the Knowledge Transfer Partnership – to harness biotechnology to extract, or 'urban mine', valuable material within printed circuit boards in an environmentally friendly way. This would save them from being shipped thousands of miles to refineries where a lot of the material is lost, whilst making those materials available for re-use.

The company has built a lab at its Bury St Edmunds facility to run the new refining process to 'close the loop' on circular IT and help to reduce the environmental footprint in replacing hardware. In late 2019 it had reached the stage of having the facilities and a business case for a pilot project, and the solution has been recognised by Defra as one of those that could make a significant contribution to the cause.

<https://n2s.co.uk/>

1. <https://www.gov.uk/government/publications/sustainability-in-information-and-communication-technology-ict-a-defra-guide>





valuable materials can be recovered and used again. The latter point also makes a difference in reducing the damage to the natural environment from just dumping materials.

It is an area in which many organisations are yet to adopt strong strategies and best practice is still developing; and the effort is undermined by the fact that recycling often involves shipping discarded equipment overseas, thereby creating a fresh carbon footprint. It is notable that Defra's sustainable technology strategy, while stating the minimisation of waste and 'circular economy' concept as core principles, includes only a brief reference to re-usable services. There is no detailed guidance on recycling and re-use, and the emphasis on reducing e-waste is largely in terms of reporting and the target of zero landfill by 2020.

But advances are being made in the more efficient recovery of materials – see the box on the activities of N2S – which is an increasingly realistic option for the disposal of hardware.

Local authorities can take a more direct approach for much of their equipment, looking for organisations that recondition and repurpose computers so they can be donated or sold on at low cost to smaller bodies with limited resources or to people on low incomes. But they also have the option of recycling the materials, and in future years this will inevitably become more sophisticated and closer to home.

## Tapping into the data

**The largest prizes, however, are in using data for sustainability improvements in a wide range of public sector operations.**

A big element of this is in the management of buildings and public spaces, ranging from civic headquarters to small customer contact offices and schools. As with the private sector, energy efficiency is a significant factor in organisations' costs, can have an impact on their local environments and feeds into society's use of resources. Increasingly sophisticated data dashboards and analytics tools have been developed to provide managers with a clear view, drilling down to granular levels, on energy consumption in different spaces and the factors that affect its usage. The tools can tap into meters to monitor electricity usage, and the sensors that are

being more widely deployed to measure different factors in the local environments.

Much of the data is delivered in real time to provide the basis of a more dynamic approach to building management, enabling organisations to adjust heating or air conditioning to reflect where it is really needed, or control the availability of rooms to strike a balance between the demand and their energy consumption. It can also influence changes in office design, the structure of buildings and new construction, aiming to create a greener property estate in the public sector.

Similar deployments can be made in public housing to improve the energy efficiency and structure of people's homes. A trend is already developing here in the UK which could prove to be a major factor over the coming years.

In the wider community, the expansion of IoT is combining with these data tools for a massive expansion of the potential. There has been a trend in which local authorities are using the transition to LED street lighting, with the data platforms to manage their operation, as a step towards using the lampposts as fixtures for an IoT infrastructure. This promises a wide range of data on issues such as traffic, cyclist and pedestrian movements, air quality, noise levels and how it can affect the structure of roads and buildings.

In turn, this can feed into operational decisions and planning on issues such as road networks, the provision of public transport, the design of pedestrian areas and standard for new buildings with an emphasis on the environmental benefits. It can also provide evidence for new regulations on issues such as carbon and noise emissions.

Related to this is the ability to use data in traffic management, helping drivers to reduce their fuel consumption and nudging them towards different types of behaviour. This goes beyond controlling traffic flows into using data to support the better parking of vehicles and the enforcement of regulations. The increasing use of public facing mobile apps is helping authorities to communicate real time information to drivers to help them make better decisions.

Alongside this is the ability to deploy other types of sensors for purposes such as monitoring water capacity levels. This is an increasingly important subject as concerns rise around the future availability



# Iconics demystifies efficiency data at BEIS

Long-time Microsoft partner Iconics has played a key role in enabling the Business, Energy and Industrial Strategy (BEIS) to rationalise its building portfolio and shrink its carbon footprint, along with introducing more flexible work hours for its staff.

Buildings are important in the sustainability equation. According to the [EU Energy performance of buildings directive](#)<sup>1</sup>, they are the largest single energy consumer in Europe, being responsible for approximately 40% of energy consumption and 36% of CO2 emissions.

Before its evolution into BIS to BEIS, the department saw the ability to analyse the performance of its buildings and use data more proactively in their management as key to reducing its energy consumption. But the data was fragmented – hundreds of spreadsheets from 70 different sources – with complex collection processes and not enough time to subject it to a full analysis.

It subsequently went looking for a business-wide system to provide a single view of a range of operational data - taking in energy statistics, meter readings, occupancy counts, financial reporting, project information and lease agreements. It also had aspirations to integrate more real time building and energy data.

The search led it to Iconics, which develops automated software for visualising, analysing and mobilising real time information for any application on any device, running its solutions on the Microsoft Azure cloud. It is a technology that can be deployed in new and existing buildings, providing crucial data for smarter and greener operations.

The company ran a proof of concept with BIS to demonstrate the capabilities of GENESIS64 software, which draws data from building facilities to corporate



systems and into a unified, secure web dashboard. BIS was convinced of the value of the dashboard and began to use the system to [collect data from its seven partner organisations with the largest proportion of its office estate](#)<sup>2</sup>.

It gave the property asset management team the ability to drill down to any building, by geographic area, and see over 70 different data types in building dashboard summaries within Azure, accessing the data in a couple of clicks rather than trawling through hundreds of spreadsheets. The solution also took advantage of Azure Table storage and Event Hub to make it scalable for wider use.

BEIS reported that the move freed up over half of the resource devoted to collating and validating the data, giving the property asset management team more time to spend on analysing trends, testing hypotheses and taking data verified steps to improve under performing properties.

This has in turn fed into its efforts to optimise the buildings' performance, improve their energy efficiency and save money for the department.

<http://www.iconics-uk.com/>

1. <https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-performance-of-buildings/energy-performance-buildings-directive>

2. <https://iconics.com/Resources/Success-Stories/The-Department-for-Business-Innovation-Skills>

of water, even in countries where it has not been a major issue to date, and will feed into future planning on the provision of water and the capacity for its usage in public places and homes.

It is part of a wider trend towards a more complex use of data in infrastructure planning and operations.

The advance of the technology and data tools is complemented by a trend towards improving the scope for data sharing between local and regional government and utilities providers, with a recognition that they need to coordinate operations and long term plans to lay the ground for a sustainable approach to energy supplies and communications. In

14. <https://www.ukauthority.com/articles/scotland-s-spatial-hub-opens-up-for-utilities/>



# Exploiting data for sustainable farming

Farming has a heavy significance to the sustainability agenda, contributing to carbon emissions through food production and sequestration through the ability of crops to absorb the element. While the environmental effects are well understood they are difficult to measure at a granular level, and there is a need for data systems that help farmers and others to assess the balance.

Bringing together the data to support the ecosystem of data and analytics companies that work in the industry is a major challenge. Data is held by large numbers of small businesses. Agrimetrics is working to address this challenge by building the infrastructure to support a market in food and farm data. In this way data will be controlled by the originator (in many cases the farmer) so that it is only shared in ways that they are comfortable with and in particular, in ways which provide value in return.

The company has been working on bringing together a spread of datasets to provide farmers with models that provide accurate estimates on carbon release and capture. This is currently a work in progress but it can make a significant contribution to sustainability.

There are also possibilities for providing data on factors such as crop, soil and weather conditions to help local authorities understand what is happening



in a single field or a stretch of countryside. This can be important in assessing the environmental impacts of planning or if it is trying to identify land of a particular quality. Agrimetrics provides data tools to support the searches for information.

In addition, there is scope for bringing together more data to help processors, retailers and consumers understand the sustainability implications of the food chain. It all contributes to keeping all parties better informed to help them make decisions.

<https://agrimetrics.co.uk>

CONTENTS

CONTENTS





this context it is notable that Scotland's Improvement Service for local government has extended its Spatial Hub to utilities providers, citing the need for the two sides to [share datasets more effectively](#)<sup>14</sup>.

Data systems can also do a lot to support the more efficient use of land in the future. There is already a strong focus on the potential in cities, reflecting their heavy energy usage and place as hot spots for carbon emissions. But it is also highly relevant to rural areas, which are crucial in the balance between carbon emissions and absorptions. Systems that can run the numbers on the effect of preserving and planting trees, or maintaining green areas, will play a crucial role in global sustainability; and the role of local authorities in relevant planning decisions means they will have to make increasing use of these systems.

This can extend to agricultural land, making it possible to measure the environmental effects of the processes in granular detail. Authorities will have to work closely with farmers in using the systems to understand the details of energy usage, carbon capture and

emissions, and field usage within their borders.

On a large scale, the possibilities are increasing for a detailed picture of the implication of planning and infrastructure decisions. Advances in data analytics, machine learning and artificial intelligence are increasing the potential for authorities to fully understand how major decisions are likely to affect the sustainability outlook, and to more closely align their efforts to promote economic growth and support public wellbeing with the environmental agenda.

This is going a step further with the emergence of the digital twin. This can recreate all the elements of an urban landscape going into great detail, making it possible to run virtual experiments on how changes to its different features and introducing new ones will affect the others around them. It is still an emerging concept but it holds great promise for obtaining even greater benefits from the data.



CONTENTS

CONTENTS





# Harnessing IoT inside buildings

**W**aste, water and energy efficiencies in the use of buildings are all big factors in sustainability, and all subject to human and organisational behaviour that can make them hard to control.

But some organisations are making progress in harnessing data from IoT devices to get a better understanding of the dynamics and take steps to exert more control over the situation, room by room. Their portfolio and facilities managers have been utilising tools such as the environmental and comfort metrics developed by Microshare – based on the Azure platform – in working on the sustainability of their properties.

It involves taking data feeds from sensors in locations that can include toilets, kitchens, meeting rooms and storage areas and building them into a dashboard customised to the organisation’s needs. This can involve rules on who gets to share the data and the analytics performed, and is supported by an app linked to the deployed sensors.

Among the company’s public sector projects has been the development of a ‘smart hospital’ in the north of England<sup>1</sup>. In July of this year it deployed a range of IoT sensors over a long-range wide area network (LoRaWAN) that has no interaction with the hospital’s core computer networks. The latter point is important as it helps to ring fence highly sensitive and regulated data within the hospital’s servers.

One of the key metrics collected has been from temperature sensors in areas where the building management system is not available. Fed through the dashboard, these have supplied managers with data that has helped them to regulate temperatures in the

building for much more efficient energy use, and to produce financial savings.

In other buildings, including King’s College London, Microshare has developed wireless sensors in toilet facilities that can monitor their usage, and combine with data on the attendance of cleaning crew and levels of user satisfaction. This feeds into the facilities maintenance regime – supporting a more efficient use of energy in cleaning the toilets – and helps the institutions improve their understanding of water usage.

The company has identified other areas in which IoT can be big for sustainability. Sensors in public housing can indicate when lights are left on or water running after a tenant has vacated a property; or when there may be problems such as leaks and excess humidity that could damage the building and lead to waste.

In the field of waste management, if sensors indicate that bins or a storage space are nowhere near full it can prompt a reduction in the number of collections. Subsequently taking a truck off the road does a little to reduce fuel consumption and improve air quality. They are tiny gains but when done regularly and at scale they add up to a significant difference for the better.

The underlying factor is that the technology can automatically provide a sustainability officer with all the data they would otherwise spend a lot of time collecting, freeing them up to focus on the strategic elements of the role.

<https://www.microshare.io>

1. <https://www.microshare.io/2019/10/29/case-study-cost-savings-productivity-gains-and-better-patient-care-at-a-major-uk-hospital-centre/>

CONTENTS

CONTENTS





# Data from the kerbside in Harrogate

**A**ppyWay changed its name from AppyParking in 2019 to emphasise that it had evolved from parking management, to being the provider of an app and digital platform to support the evolution of smart cities through kerbside management.

This involves the use of kerbside data, APIs and full stack management systems; and in a handful of cities and large towns it is contributing to the effort to reduce congestion and provide a cleaner, more fuel-efficient environment.

In January 2019 it launched an initiative in Harrogate, along with the borough and North Yorkshire County councils, providing its Smart City Parking solution for more efficient off- and on-street parking. This involved installation of 2,156 smart sensors and the consolidation of digitised parking data, sensors, payments, automatic number plate recognition barriers and linear pricing into a single solution for the two authorities.

Drivers are encouraged to download the accompanying app, on which they register a debit or credit card for payments, use its availability feature to find a parking spot, then start the payment with a single click. The sensor registers the arrival and when they pull away, with the payment calculated by the minute and automatically taken from their card.



This makes things easier for drivers who are better able to find a spot and park without worrying about a session expiring. It also helps to reduce the small hold-ups as drivers slow down and look around for parking spaces, doing a little more to reduce congestion and emissions.

The data platform enables the local authorities to see how



their assets are being consumed – how often and for how long – through a web analytics platform hosted on Microsoft Azure. This can help with revenue planning, and feed into policies for reducing congestion and carbon emissions from town and city centres.

It also helps to reduce the need for parking enforcement officers to randomly search for violations, as they can respond to alerts from a sensor when a car has parked without a payment or registration through the app.

Early results from the project indicated that drivers had an average time saving of 21% in looking for a parking space. In a city where there are around two million parking sessions per year this means less time driving in busy areas, reducing overall fuel consumption and contributing to better air quality.

Further results providing a more detailed breakdown of the benefits are expected early in 2020.

Appyway is responding to new developments in kerbside management such as exploring the relationship between parking and Electric Vehicle (EV) charging in Coventry & Plymouth to see how councils can influence driver behaviour. to stop them from using EV spots if not needed, and the potential for freeing up disabled bays for other drivers at non-peak times. It all involves providing them with data they did not previously have, feeding into strategies to strike the right balance between ease for drivers and cutting congestion and emissions.

<https://appyway.com/portfolio/smart-city-parking>

CONTENTS

CONTENTS

# 6. Microsoft and carbon neutrality

Microsoft's operations have been carbon neutral since 2012

**M**icrosoft made headlines in January 2020 for its latest commitment to the sustainability cause, with the declaration of a goal to make itself carbon negative by 2030, and by 2050 to remove all the carbon it has emitted directly or by electrical consumption since it was founded in 1975.

The move has come with an aggressive programme to cut carbon emissions by itself and its supply and value chains by more than half by 2050. This includes reducing its own emissions to near zero by the mid 2020s, and using its technology to help suppliers and customers reduce their carbon footprints. Beginning in 2021 it will also make own carbon reduction an explicit aspect of its procurement processes and publish an annual Environmental Sustainability Report. In addition, it will advocate public policies to accelerate the reduction of carbon emissions.

The company has identified [seven principles as a foundation for meeting its targets](#)<sup>14</sup>:

- Ensure the effort is grounded in sciences and mathematics.
- Take responsibility for its own carbon footprint.
- Invest in new carbon reduction and removal technology, deploying \$1 billion of its capital in a Climate Innovation Fund.
- Empower customers around the world to reduce their own carbon footprints.
- Ensure effective transparency through the annual Environmental Sustainability Report.
- Use its voice on carbon related public policy issues.
- Enlist its employees into the campaign, creating new opportunities to enable them to contribute to the efforts.

Among the details of the plan to reduce its own emissions are moving to 100% use of renewable

energy by 2025, electrifying the vehicle fleet for its global campus operations by 2030, and phasing in an internal carbon tax, paid by each division based on its emissions.

## Heavy commitment

**This is the latest move in a heavy commitment to the sustainability cause. Since 2012 the company's operations have been carbon neutral, due largely to the internal carbon tax that funds reductions, clean energy and offset projects.**

The effort has involved cutting energy use by more than 20% at its own facilities, heavy buying of green energy, using cloud and AI technology to reduce its emissions, and working with suppliers to encourage them to report and reduce their own emissions. The use of data has made a significant contribution to this, tracking and reporting emissions and energy across 1,200 facilities in 110 countries.

It has taken action in other areas: such as aiming for 100% water replenishment by 2025 in locations where it is in short supply; setting out to achieve zero waste certification by 2022; and adopting a policy of net zero deforestation in new constructions.

## Harnessing sustainability

**The company also places a premium on supporting the sustainability of its customers, with those in local and regional government figuring prominently, notably through its cloud services.**

Microsoft's [Environmental Stewardship Report](#)<sup>15</sup> highlights that its cloud services are up to 93% more energy efficient and 98% more carbon efficient than traditional enterprise data centres – all due to investments in IT efficiency and renewable energy. And in a [report in Wired in October 2019](#)<sup>16</sup>, the company

14. <https://blogs.microsoft.com/blog/2020/01/16/microsoft-will-be-carbon-negative-by-2030/>

15. <https://www.microsoft.com/en-us/corporate-responsibility/sustainability>

16. <https://www.wired.com/story/amazon-google-microsoft-green-clouds-and-hyperscale-data-centers/>



# Demonstrating the digital twin

**T**he concept of a digital twin is in the relatively early stages of its evolution, but it is emerging as a potentially powerful tool in supporting the environmental effort within city planning and infrastructure management.

Infrastructure software company Bentley has been working with a number of authorities to develop the concept and take it into real world usage, with sustainability being a major factor in its application.

A digital twin is a digital representation of a physical asset that can harness data to provide information on its design, state, condition and history, and enable the sharing of the data to support informed decision making. It gives authorities a view of the details and implications of planned changes in a city before the big investment decisions are made.

Bentley has been developing digital twins on the Microsoft Azure platform, with projects including a demonstrator focused on the Institute for Manufacturing (IfM) at the University of Cambridge in the west of the city. This is aimed at demonstrating the impact on facilities management, productivity and wellbeing around the West Cambridge campus, and to provide foundations for integrating data to optimise services such as power, waste management and transport – with a view to scaling it up to a city-wide level.

The effort has involved the deployment of 50 IoT sensors within the IfM to capture data on building management systems, the provision of 3D business information management (BIM) modelling using GeoSLAM context capture scan and Topcon 3D geometry and photogrammetry of the site, a good quality asset register and APIs (with Redbite) to integrate asset data with the BIM model using Bentley's AssetWise software.

One of the early applications has been in the generation of insights for reducing energy consumption around the site.

This is an early example of how the concept is being used in the UK, and there is potential for a significant growth in its deployment as the Centre for Digital Built Britain is working on a Digital Twin Hub, a



collaborative learning community for those who are developing models. It has also published the Gemini Principles to guide development of a National Digital Twin.

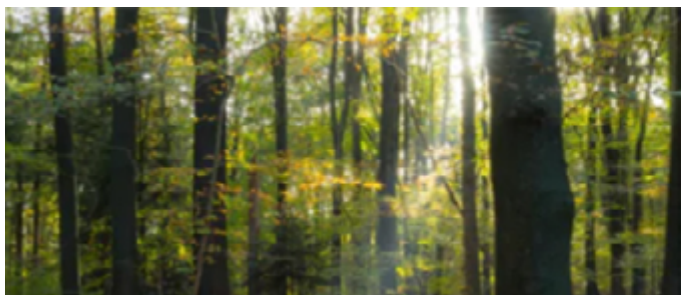
Bentley has also worked with cities in Nordic countries in finding sustainability use cases. In Helsinki a digital twin has been used in creating a solar prediction map that assesses the levels of sunlight likely to hit specific properties and helps people to identify whether they should invest in solar panels.

The city authority has also used the software to examine the likely impact of high-rise buildings in terms of the shadows they create and their effect on wind velocities. These are significant factors in the installation of renewable energy infrastructure, with the data helping to assess the likely environmental returns on investment.

Meanwhile, the city of Lisbon created a digital twin for urban flood simulation that enabled them to comprehensively model alternative scenarios and develop a plan for several return periods. This helped the city to avoid 20 big floods over the next century. Lisbon is ready to manage against changing climate conditions and urbanization with their drainage master plan.

The company is also involved in efforts to help cities identify where to place the recharging infrastructure to support the use of electric vehicles, aiming for areas in which it does most to encourage drivers to switch.

<https://www.bentley.com/en>



received A ratings on energy efficiency, transparency and technological innovation for its Azure cloud platform, and a total renewable energy portfolio figure of 1.9GW.

The company is also committed to building sustainable devices, with production facilities that reduce and where possible eliminate waste through the re-use of materials, source reduction and recycling. It has a policy on the responsible sourcing of raw materials, developed with industry groups and non-governmental organisations. And its production processes are designed in line with the agenda.

There is an even larger potential in the use of data, especially as IoT technology begins to supply multiple streams of real time data on factors that are crucial to the environment. This goes beyond temperature and air quality into areas such as noise levels, traffic and people movements, water levels and movements and soil quality.

Authorities have possibilities to use such types of data to gain insights using elements of Microsoft's core offerings, notably the Power BI platform for data visualisation and analysis. It provides the dashboards and capacity to integrate with other applications that enable organisations to get a clear picture of factors they have identified as significant to the environment. [Camden Council has provided an example<sup>17</sup>](https://community.powerbi.com/t5/Data-Stories-Gallery/UK-Public-Sector-Local-amp-Regional-Government/td-p/120229) of how it can be used to visualise and interact with large disparate datasets to provide insights on most issues facing a local authority.

Beyond this is a growing range of solutions emerging



from Microsoft partners, many of them built on the Azure cloud and designed to provide a more detailed and nuanced analysis of the specific elements of sustainability. The capabilities of these are increasing with the expansion of IoT and advances in machine learning and AI.

## AI for Earth

**Microsoft has made a commitment to the utilisation of data in AI for Earth, a programme designed to support innovations in the monitoring, modelling and ultimately the management of the planet's natural systems.**

At the end of 2019 the programme involved 389 grantees in 63 countries – covering initiatives such as Land Cover Mappers, which gives organisations a mapping tool to analyse, monitor and manage natural resources; and FarmBeats, which provides farmers with real time data and insights to increase food production while reducing costs. Others focus on monitoring insect populations, obtaining crowd-sourced insights on how different species are responding to environmental changes, and enabling landowners and conservationists to monitor the state of forests with high resolution satellite imagery.

Overall it has placed sustainability at the heart of its business, and recognises that this is a multi-faceted issue that requires a combination of attention to the detail of specific issues, and a more holistic view that sees how they can all influence each other.

CONTENTS

CONTENTS

17. <https://community.powerbi.com/t5/Data-Stories-Gallery/UK-Public-Sector-Local-amp-Regional-Government/td-p/120229>







# Visualising operational assets

**O**perational asset management plays a big part not just in the efficiency of an organisation's operations, but also in helping it become more environmentally friendly.

Schneider Electric's focus on operational technology has led it to create digital solutions that help organisations in sectors including utilities and transport to develop efficient strategies.

The firm has proof of concepts within the utility industry that are drawing on IoT sensors and machine learning to feed into predictive analytics for the maintenance of assets. It uses Schneider's Ecostruxure SCADA telemetry solution – based on the Supervisory Control and Data Acquisition industrial control system – running on the Microsoft Azure cloud to pull together the data necessary for predictive maintenance.

IoT sensors are fixed to assets, providing a flow of data that is run through the analytical engine to identify patterns, problems and alert the maintenance teams. This helps their customers to move away from traditional routine maintenance models to a predictive and selective model where efforts are concentrated on gaining the most value.

Predictive maintenance provides for a more efficient regime that monitors and helps to reduce risk in the environment and also means that the teams are not using as much fuel in travelling, reducing their carbon footprint and saving time.

It also contributes to two of the UN's sustainable development goals: goal 7 for affordable and clean energy; and goal 9 for resilient infrastructure and sustainable industrialisation.

The proof of concepts are in relatively early days but initial feedback has been positive. They are contributing to the company's effort to build up a profile that factors in the environmental impact of its assets. There is also the potential to integrate the predictive analytics with the company's asset catalogue to give it a clear view of its spare parts and stock to support a 'just in time' operation.

Schneider has also explored the potential of the 'control room of the future' utilising situational awareness and other tools to obtain a better visibility of a large-scale industrial estate. In a project with the Abu Dhabi National Oil Company<sup>1</sup> this involved the creation of a 'virtual wall', a large visualisation of operational assets and data flows that can provide a better perspective on how to utilise technology and improve business operations. In turn this can contribute to sustainability factors such as improved energy efficiency and maintenance regimes.

The company has also published a report<sup>2</sup>, compiled with Greenbiz Research, on corporate progress on energy and sustainability initiatives. Its conclusion highlights that active, strategic energy and resource management presents significant top and bottom line benefits, and that the opportunities are taking on different forms. Among these are that new

technologies and data streams are helping to boost, analyse and optimise results; and that there are new suppliers, business models and financing mechanisms to support the effort.

<https://www.se.com/uk/en/>

1. <https://www.oilandgasmiddleeast.com/drilling-production/33281-the-company-behind-adnoc-panorama-command-centre-on-digitalisation-in-the-region>
2. <https://insights.se.com/report/>



CONTENTS

CONTENTS





# Managing buildings with real time data

**M**ost buildings in public and private sectors are managed on fixed assumptions rather than real time data. Many have their heating distributed and rooms used inefficiently, which increases their energy use to well above the necessary levels.

There have been problems in providing facilities managers with the right data for a proper demand side service, which has implications for energy consumption and issues such as room occupancy and where to direct the efforts of cleaning staff, whose use of chemicals also has a significance to sustainability.

Tech start-up BlockDox has developed a platform on Azure that acquires data from sensors, aggregates it and makes it available to data scientists who can begin to assess the environmental effects of a building's operation. It can do this through its own team of data scientists or leave it with an in-house team.

A front-end dashboard makes it possible for facilities managers to understand factors such as sustainability scores, dwell time in rooms, people flows and the cost consumption of individual buildings. This can support the development of management strategies to significantly reduce energy consumption.

In late 2019 BlockDox was planning installations with some UK universities to combine data streams to enable their building management systems to respond to fluctuations in the key indicators. One important factor is air being trapped inside a building when it is not possible to open windows, which affects the air quality along with temperatures, CO2 levels and humidity.

It has also identified the NHS as an area in which there is more scope for energy efficiency, with the promise of reinvesting savings in front-line services.

<https://www.blockdox.com/>

CONTENTS

CONTENTS







# 7. Local and regional priority

Enshrining sustainability into digital and data policy - and practice - in local and regional government is a priority for 2020

**L**ocal and regional authorities are acknowledging their responsibilities when it comes to sustainability and carbon neutrality and are beginning to look for solutions. Many have appointed officers dedicated to green/environmental/sustainability strategies, but are yet to embed the role of digital into their thinking on this front.

There needs to be a recognition that there is no single solution: rather, there are several elements to sustainability and it is a factor that must be taken into account in a wide range of public services and responsibilities. This involves investigating solutions for specific issues, and taking on the broad data capability to give a wide and detailed picture of the landscape, and how developments in one area can affect another.

Beyond that, it requires that thinking about sustainability is embedded into broader digital strategies. The two should go hand-in-hand, with factors for each feeding into the major decisions on the other. It will require a shift - but not a radical change - in the mindset and it should not be beyond the capability of any local or regional authority to harness digital and data into long term sustainability thinking.

It will take a combination of innovation and a commitment to using evidence from the data – with the political will to push through radical changes in the organisation’s operations and policies. This gives local and regional authorities the chance to build sustainable futures for both their operations and their communities.

For more information on Microsoft's commitment to sustainability visit:  
<https://news.microsoft.com/climate/>



CONTENTS

CONTENTS





This white paper was researched and created by UKAuthority thanks to support from Microsoft UK.

Authors: Mark Say & Helen Olsen Bedford

© 2020 UKAuthority. All rights reserved. This document is provided 'as-is'. Information and views expressed in this document, including URL and other web references, may change without notice.

#### Picture credits

Covers: iStock-ipopba / Page 5: iStock-Boonyachaoat / Page 7: iStock-Maxshot / Page 8: iStock-AscentXmedia / Page 11: iStock-Obradovic / Page 17: iStock-Konoplytska / Page 24: iStock-Andrii Yalanskyi / Page 25: iStock-AlexBrylov  
All other images from Microsoft and Partner websites.

**UKAuthority**

