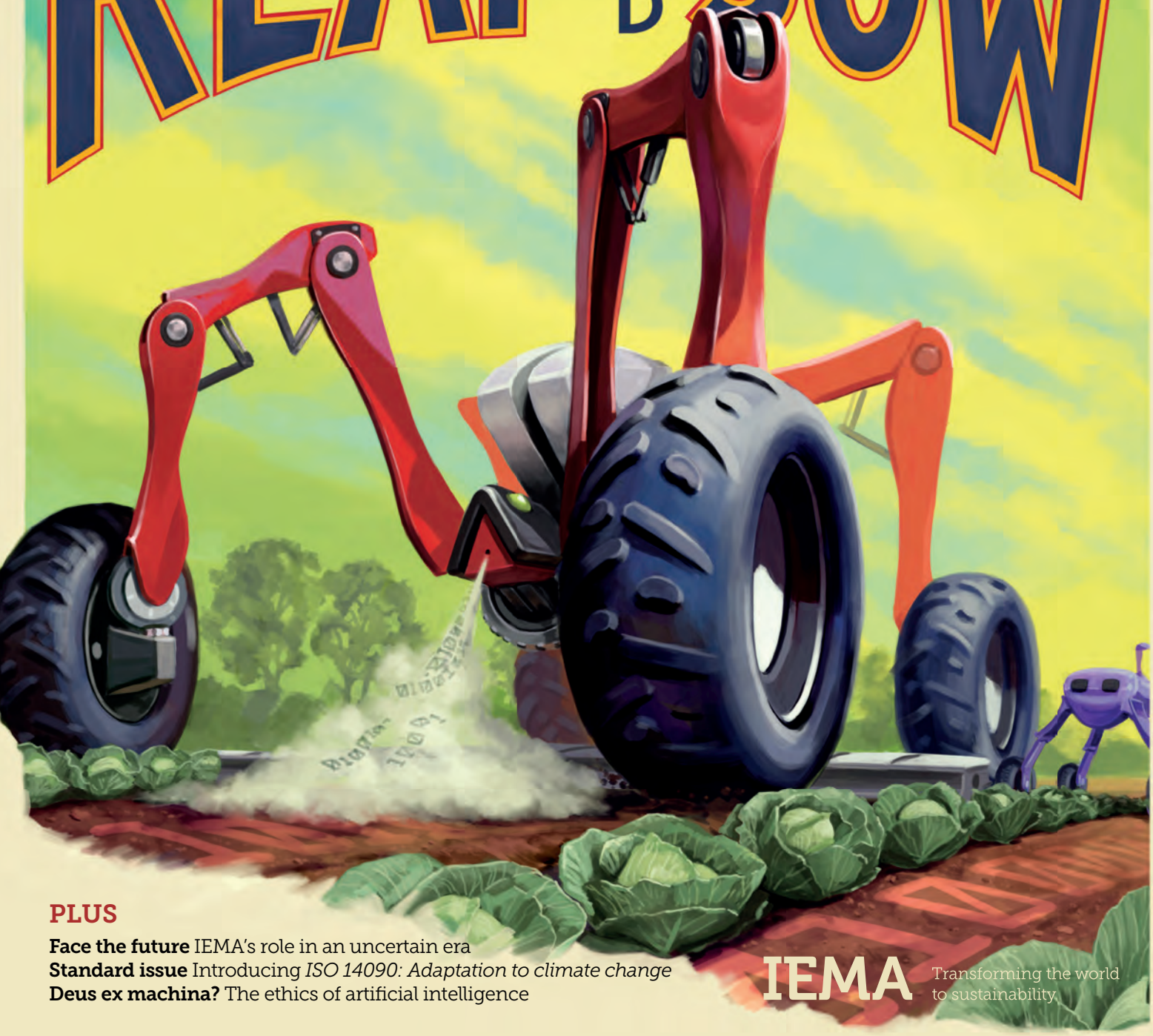
TRANSFORM

Environment
Economy
Society

FOR ENVIRONMENT AND SUSTAINABILITY PROFESSIONALS

October 2019
www.iema-transform.net

REAP AND SOW



PLUS

Face the future IEMA's role in an uncertain era
Standard issue Introducing *ISO 14090: Adaptation to climate change*
Deus ex machina? The ethics of artificial intelligence

IEMA Transforming the world to sustainability

OUR SUITE OF PROFESSIONAL QUALIFICATIONS SUPPORT YOUR DEVELOPMENT THROUGHOUT YOUR CAREER.

With expert tutors teaching across the framework – from entry level foundation certificate to the diploma – you're learning from the highest level of knowledge and expertise every step of your career development.

- IEMA foundation certificate in environmental management
- IEMA certificate in environmental management
- IEMA diploma in sustainable business practice

Talk to our team on **0808 168 5874.**

Or, visit **makeuk.org** and search **'IEMA'.**

makeuk.org/training

IEMA
Transforming the world to sustainability
TRAINING CENTRE

MAKE BUSINESS

Contents

OCTOBER

16

Upfront

Regulars

Connect

Web exclusives

Zero-carbon heating emissions
Paul Reeve shares the Committee on Climate Change's suggestions for decarbonising UK heating
bit.ly/CCCzero_carbon

Waste not, want not
Energy efficiency management may be unfashionable, says Andy Clarke, but it has a key role in slowing down climate change
bit.ly/want_not

COVER ILLUSTRATION: OLIVIA CHANCELLOR

12

18

26

29

FEATURES

Spotlight

TIM BALCON, CEO OF IEMA

Keep calm and carry on

It has been an exciting couple of months for IEMA, not least because we've welcomed Paul Leinster as our new chair of the board of directors. We have enjoyed superb guidance from Diana Montgomery and are now looking forward to taking full advantage of the extensive expertise and experience that Paul, together with his colleagues on the board, offer in developing IEMA further. *Transform*'s full interview with both can be found on page 12.

We also celebrated our very first IEMA Sustainability Impact Awards – a great success, with more than 420 professionals joining us for the celebratory lunch. The innovative efforts demonstrated by the awards submissions highlights just how much work there is to be done, and how many opportunities there are, to address the climate and environmental emergency at hand.

The growing evidence showing the scale of the emergency, and the gap between what science demands and what policy is delivering, prompted us to reaffirm our commitment by formally declaring that there is a climate and environmental emergency. Systemic change is now required to address not just climate change, but also the devastation of the biosphere.

We have been highlighting and encouraging change for 20 years, but the level of profile now afforded this narrative is new, and we should be mindful of the urgency of what we do. However, in order to create considered and meaningful change, it's imperative that we remain calm and professional. Although IEMA's 'business as usual' activity continues to support and inform our membership, we need to step it up a level – especially when it comes to the critically relevant leadership our influential body of membership can bring. In calling for professional urgency in response to the climate and environmental emergency, we appeal to every organisation to effect critical and transformational change, now.

Our climate change declaration carries with it a programme of action that has been carefully crafted, with input from members of our climate change committee. Most importantly, IEMA's board is bringing in changes within our governance structures so that our 'business as usual' is even more impactful. Our Sustainability Impact Awards powerfully demonstrated how the organisations shortlisted have been dealing with the issues raised by the climate and environmental emergency. We need to keep upping our game, and our professional response continues to be: 'working together for change'. There's a challenge for us all to find a way through this emergency and strive for calm, rational thinking to achieve the change required.

Read our full report on the awards on page 29.

IEMA Transforming the world to sustainability

IEMA is the professional body for everyone working in environment and sustainability. We provide resources and tools, research and knowledge sharing along with high quality formal training and qualifications to meet the real-world needs of our members. We believe that together we're positively changing attitudes to sustainability as a progressive force for good. Together we're transforming the world to sustainability.

IEMA
City Office Park, Tritton Road,
Lincoln, Lincolnshire, LN6 7AS
tel: +44 (0) 1522 540069
info@iema.net | www.iema.net

Editor
Sharon Maguire
sharon.maguire@redactive.co.uk

Assistant editor
Kathryn Manning
kathryn.manning@redactive.co.uk

IEMA head of commercial development
Emma Buyers
e.buyers@iema.net

Feature and news journalist
Christopher Seekings
christopher.seekings@redactive.co.uk
iema@redactive.co.uk

Sub-editor
Kate Bennett

Content assistant
Nicole Bains

Business development manager
Daniel Goodwin
tel: +44 (0) 20 7880 6206
daniel.goodwin@redactive.co.uk

Recruitment
tel: +44 (0) 20 7880 7665
iemajobs@redactive.co.uk

Designer
Callum Tomsett

Picture editor
Claire Echavarry

Account director
Will Hurrell

Subscriptions
subscriptions@iema-transform.net
The 2019 annual subscription rate is £142.

Production manager
Aysha Miah-Edwards

Printer
Warners Midlands PLC, Lincolnshire

Published by
Redactive Publishing Ltd
Level 5, 78 Chamber Street, London, E1 8BL
tel: +44 (0) 20 7880 6200
www.redactive.co.uk

redactive

ISSN 14727625

MIX Paper from responsible sources FSC® C017177 www.fsc.org

recycle

The paper used to print *Transform* comes from sustainable sources. Visit: transform.iema.net/think-green.

AGRICULTURE

Agritech key to tackling poverty and climate shocks – World Bank

Agricultural technology is the key to eliminating poverty, meeting food demand and dealing with climate change, according to a new report from the World Bank. The 269-page document highlights the fact that nearly 80% of the world's extreme poor live rurally, most relying on farming for their livelihood. At the same time, climate change and deteriorating natural resources are exacerbating poverty, harvest failures and conflicts.

Precision farming systems, real-time crop management advice and various other agritech innovations will be critical in minimising these risks, but there is an "innovation paradox" , according to the report: research and development (R&D) has been stagnating or falling in the countries that most need it, resulting in a persistent productivity slowdown.

In 2011, the developed world spent 3.25% of its agricultural GDP on R&D, compared with 0.52% in developing countries; investment is declining in half of African nations. This is despite innovations allowing farmers to raise yields, manage inputs more efficiently, adopt new crops and production systems, improve product quality, conserve natural resources and adapt to climate shocks. Productivity improvements in agriculture have a larger impact on poverty reduction than any other industry – roughly twice that of manufacturing.

The researchers also highlight that insufficient R&D into communication makes it difficult for farmers to access information, finance and insurance. They encourage the removal of onerous regulations, reduce market participation restrictions and strengthen intellectual property rights to boost R&D spending.

"New technologies are improving access to information, finance and insurance in all sectors," said Ceyla Pazarbasioglu, World Bank vice president for equitable growth, finance and institutions. "This can help raise the productivity of low-skilled farmers, but only with incentives and capabilities to develop and scale these technologies."

Report: bit.ly/2kQnDiS

PHOTOGRAPHY: GETTY

BUSINESSWATCH

Burger King ditches plastic toys

Burger King will no longer give away plastic toys with children's meals at its UK stores, saving approximately 320 tonnes of single-use plastic waste annually.

The public has been invited to return old plastic toys to its restaurants – even if they are not from Burger King – where they will be recycled and later turned into other items.

"Burger King UK is not making a vague gesture, which is so often the case in this sector – it is taking significant action," commented Jamie Hall, founder of circular economy design business Pentatonic.

bit.ly/2kWlhix

Unilever achieves 100% renewable electricity

Unilever has taken a step towards its goal of carbon neutrality by 2030, announcing that its facilities are now powered by 100% renewable electricity across five continents. The transition has supported the development of local renewable energy markets, with 38% supplied through power purchase arrangements and green electricity tariffs. Where it has not been feasible to do this, Unilever has purchased renewable energy certificates – openly-traded certificates linked to renewable electricity generation.

bit.ly/2msju5p

Gucci now entirely carbon neutral

Gucci has announced that it is now an entirely carbon neutral company after investing in organic fibres, renewable electricity, energy efficiency, and carbon offsetting. Italy's most valuable luxury brand says it has offset all emissions through four REDD+ projects that support forest conservation in an "unprecedented commitment" to champion sustainability in fashion.

"A new era of corporate accountability is upon us and we need to be diligent in taking all steps to mitigate our impacts," said Gucci CEO Marco Bizzarri.

bit.ly/2kvU5am

IMAGES: ISTOCK/SHUTTERSTOCK

MITIGATION

Technology could remove all excess CO_2 by 2050

Humanity has the technology to permanently sequester all excess carbon dioxide by midway through this century, according to a report from the Foundation for Climate Restoration.

The report states that there are sufficient basalt rock deposits on every continent to store far more than the trillions of CO_2 produced by human-driven climate change. Theoretically, enough carbon-removal machines could be built to restore the climate back to the way it was a century ago by 2050, with no major technological breakthroughs needed.

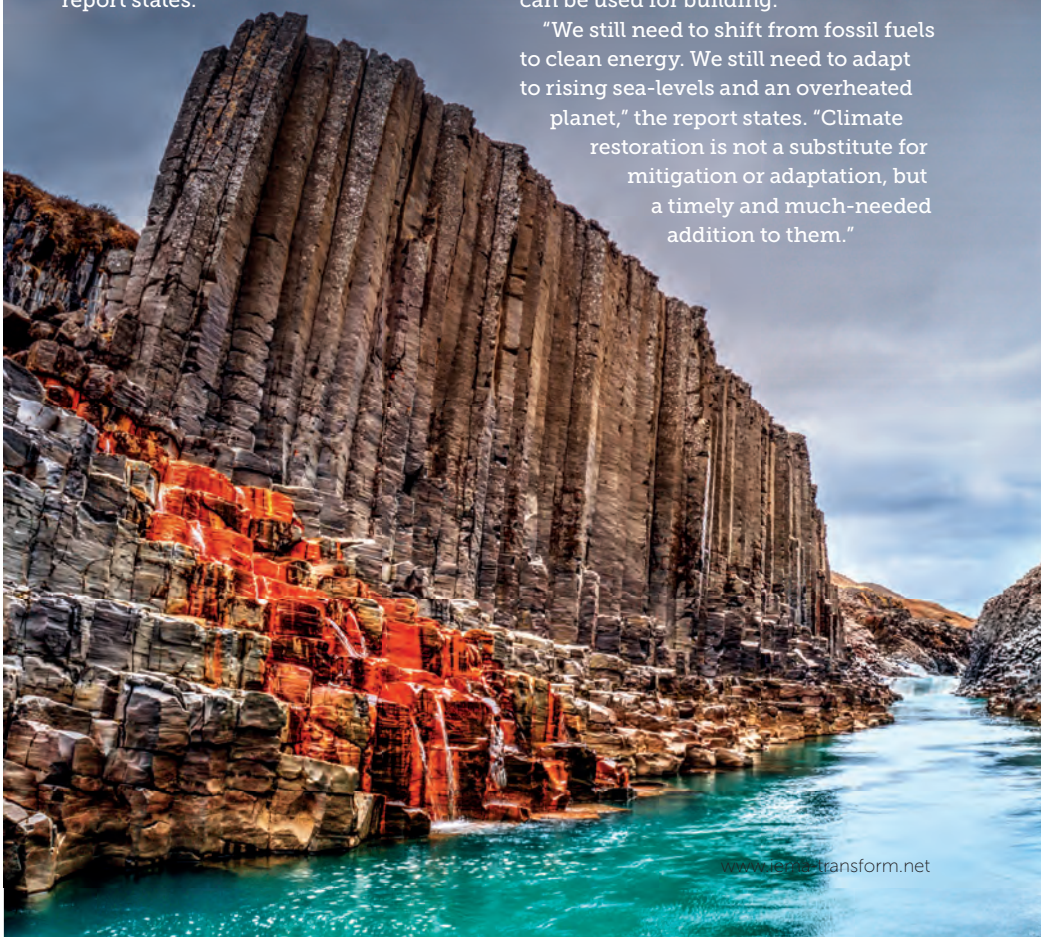
"New technologies may emerge that allow us to achieve the goal faster and more easily, but we don't need to wait. We can't afford to wait," the report states.

"Similar to the ambitious goals of eradicating smallpox, and flying to the moon and back safely, the goal of climate restoration is ambitious, time-bound, specific, and measurable."

The researchers said that deep-underground sequestration of all excess CO_2 by 2050 would involve annual spending of $3trn for 30 years – by way of comparison, global military funding totals $1.9trn a year. However, governments are not budgeting sufficiently for carbon capture, and most climate advocacy groups are not asking for it, according to the report.

It gives examples of innovative companies that are already injecting carbon deep underground, with one even turning CO_2 into limestone that can be used for building.

"We still need to shift from fossil fuels to clean energy. We still need to adapt to rising sea-levels and an overheated planet," the report states. "Climate restoration is not a substitute for mitigation or adaptation, but a timely and much-needed addition to them."



AGRICULTURE

Blockchain-based supply chain sustainability model hailed a success

A blockchain model has been shown to improve supply chain transparency and deliver earlier financing without increasing production costs.

The Trado blockchain model was piloted with tea farmers in Malawi last year. Workers were paid to feed social and ecological data into the system in a 'data-for-benefits' swap between buyer and seller, using banks' supply chain financing. This gave buyers access to information about the production process, improving traceability and rewarding producers who carry out sustainability practices. Data on land management, deforestation, biodiversity and socio-economic development can all be incorporated.

The University of Cambridge Institute for Sustainability Leadership (CISL) said it had been shown to have a 'net zero' impact on production costs and could be replicated in other contexts.

Around 500 million smallholder farmers produce 80% of the food consumed in developing countries, where the cost of borrowing is high, so the model's incentives could boost sustainability practices.

"This is a significant step towards the further development and understanding of how technology-driven innovation can support the UN's Sustainable Development Goals," said CISL senior programme manager Thomas Verhagen.

ENERGY

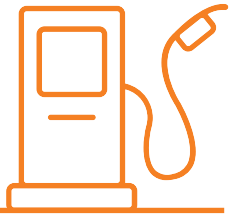
Oil and gas companies all undermining Paris Agreement

No major oil and gas firms are aligned with the Paris Agreement's ambition to limit global warming to 2°C, a study by the $15trn-backed Transition Pathway Initiative (TPI) has uncovered. After assessing the carbon performance of 50 oil and gas companies, the TPI also found that just two are aligned with the pledges – Royal Dutch Shell and Repsol.

The study also involved assessment of climate risk corporate governance, finding that coal is the worst-performing sector; 14 companies failed to recognise climate change as a relevant risk.

Of all the energy firms studied, 22% fall into the bottom ranking for climate risk governance. Of these, 14 are in the coal sector, six in oil and gas, and nine electric utilities.

The TPI is a global initiative led by asset managers. It warned that investors are increasingly concerned that the energy sector is failing to respond quickly enough to climate change.



SHORTCUTS

UK food security at risk

Nearly a fifth of the UK's fruit and vegetables come from countries threatened by climate breakdown, leaving Britain's food security at risk, MPs have warned.

The Environmental Audit Committee said it was "deeply concerned" about rising food prices, and accused the government of complacency over the risk posed by climate change.

Brexit has increased the threat, according to the MPs, who called on ministers to release all information about the food security and cost risks associated with a no-deal exit.

bit.ly/2mkekrV

Climate progress stalls

The rate of global decarbonisation has slowed to its lowest level since 2011 after four years of moderate progress, leaving the Paris Agreement's goals further out of reach. Analysis by PwC shows that carbon intensity of the global economy fell by 1.6% in 2018, less than half the 3.3% reduction seen in 2015, and well below the 7.5% cut needed every year until 2100.

"There's a huge gap between the rhetoric of the 'climate emergency' and the reality of policy responses," said PwC climate change director Jonathan Grant.

bit.ly/2krxmw5

Brexit threatens EU climate action

A lack of faith between the UK and EU amid difficult Brexit negotiations risks future cooperation tackling climate change, research from the University of Sheffield suggests

Nothing could stop the UK weakening environmental laws under a no-deal exit, according to the analysis, while a US trade deal may risk EU collaboration.

"Brexit has created uncertainty and raised the risk that the climate crisis will be pushed off the political agenda at this critical moment," professor Charlotte Burns warned.

bit.ly/2krlIRL

TECHNOLOGY

New guidance on the digital economy

The world is undergoing immense change. Climate change, population growth, threats to nature, resource concerns and global development pressure are all combining to create a perfect storm of issues. With their impacts on businesses, economic prosperity, communities, health and wellbeing, these problems represent a challenge for sustainability professionals.

In parallel, the fourth industrial revolution is causing a fundamental shift in the way societies live and work – a shift that is mostly yet to be understood and resolved. As disruptive technologies such as machine learning are embedded across the Internet of Things, data centres and cloud computing, we will see the emergence of new business models, products and services.

> "The fourth industrial revolution is causing a fundamental shift in the way societies live and work"

In light of the opportunities and risks that these changes may bring, a group of 20 senior sustainability professionals, with specific interest in the impact of the fourth industrial revolution on sustainability, have met regularly as the IEMA Fellows Working Group on Disruptive Technologies & the Digital Economy to discuss these issues. Since their first meeting, the Fellows have been working on a thought piece, the first in a planned series that will be peer-reviewed by experts in the digital economy. The series will set out the challenges for businesses making the transition to a sustainable digital economy. While providing some insight into the impact of disruptive technologies on society, the environment and the global economy, the document also suggests what steps professionals may take within their organisations to begin that transition.

For more information about the Fellows network, please contact Marc Jourdan at m.jourdan@iema.net

PHOTOGRAPHY: ISTOCK, SHUTTERSTOCK

EIA

Upcoming digital environmental assessment primer

'Embracing innovation and digital' is one of IEMA's four strategic themes of action for proportionate EIA, and a growing number of EIA practitioners are seeking to implement innovation and digital working in practice. This includes the preparation of digital EIA reporting, of which several examples from live projects now exist.

In 2018, IEMA formed a new working group with the aim of advocating for and supporting digital EIA. There are three separate workstreams, with each tackling a different key issue. They are: geographic information systems, data and technology; political and regulatory acceptance; and raising the profile and communicating the benefits.

This working group has adopted a broad view of the role of 'digital' in environmental assessment. It was recognised that digital innovation and digital ways of working are relevant to practice beyond statutory EIA. Furthermore, if digital environmental assessment is to reach its full potential then ways of working throughout the process of environmental assessment should be examined, and aspirations for digital environmental assessment not limited to the digitalisation of reporting.

The working group will publish *Digital Environmental Assessment: A Primer for Embracing Innovation and Digital Working* later this year. This document will explore the current situation, opportunities and challenges presented by digital working, as well as case study examples of recent digital practice. Ideas for the future direction of digital environmental assessment will also be presented, in order to trigger discussion and focus the future direction of the working group.

STUDENTS

IEMA to visit careers fairs

Over the next few months, IEMA will be attending a selection of university careers fairs to ensure that graduates entering the environment and sustainability profession are equipped with the knowledge, skills and tools required to drive change in their workplace. We'll be talking to students about how membership will enable them to have the best start to their career. The careers fairs we're attending are:

- Edinburgh University Careers Fair and Third Sector Jobs Fair – 9 and 10 October
- Reading University Recruitment and Opportunities Fair – 16 October
- Nottingham Trent University City Placement and Graduate Jobs Fair – 23 October
- Salford University Environment and Life Sciences Careers Fair – 13 November

IEMA student membership offers a range of resources, such as events, webinars and *Transform* magazine. IEMA can help students and graduates expand their knowledge, network and join the discussions that are driving our vision.

The IEMA Futures network is interlinked with our student and graduate membership and looks to engage and inspire these early and future environment and sustainability professionals to lead change for future generations. The Futures Network's next event is the Sustainability Conference where, through a series of talks from renowned professionals, along with interactive workshops designed to promote wider thinking, delegates will learn more about sustainability, what roles they can play and how they can help foster a sustainable future.

Where: University of Salford, Peel Hall
When: 14 November, 9:30am-4pm

EVENT

Join us at this year's EMEX

EMEX is a leading UK energy exhibition and IEMA is again organising the Climate and Sustainability theatre for this year's event, which will be held at London Excel on 27-28 November. Our Climate Change and Energy network has been instrumental in sourcing leading presentations.

We will welcome James Dixon, FIEMA who will discuss his work at the Newcastle upon Tyne Hospitals NHS Foundation Trust. Dan Hamza-Goodacre, FIEMA CEnv of the Kigali Cooling Efficiency Program and Professor Toby Peters from the University of Birmingham will present on the challenge of cooling globally. Network members will be on hand at lunchtime for small-group support and advice surgeries on key challenges.

Further highlights will include a presentation by IEMA policy chief Martin Baxter on the future of UK environmental governance, and IEMA policy and engagement lead Nick Blyth presenting on IEMA's key climate change developments and the work we are leading on climate change coordination and carbon neutrality. Colleagues from Sweden will give a corporate case study presentation on 'carbon positive', and we will also welcome Dr Matt Brander from Edinburgh University, who will provide insights on greenhouse gas accounting.

IEMA staff will be available to discuss professional membership and wider member benefits. Our stand will be right next to the IEMA Climate Change and Sustainability Theatre. We hope to see you there!

IEMA at the RWM Expo

In September, we attended RWM – the UK's largest recycling and waste management exhibition. The event attracts thousands of recycling, waste, business and local authority professionals, giving us the opportunity to interact with a diverse and relevant visitor base. RWM provides the biggest platform for innovations that are shaping the future of sustainability, and this was reflected in the conversations that we had with delegates who were excited to share their research and the developments within the sector. We were delighted to have two speakers representing IEMA across the two-day exhibition.

This legislative update has been provided by **Cedrec Information Systems**, available at **cedrec.com**

cedrec legislation made simple

NEW REGULATIONS

THE LATEST
■ LEGISLATION ■ GUIDANCE ■ CONSULTATION

PENDING

Planning

The Planning (Scotland) Act 2019 makes amendments to the Town and Country Planning (Scotland) Act 1997 to include provisions on the purpose of planning, an open space strategy, an assessment of environmental effects and a forestry and woodland strategy.
cedr.ec/6c6

12 OCTOBER 2019

Water pollution

The Environmental Protection (Cotton Buds) (Scotland) Regulations 2019 make it an offence to manufacture, supply, offer to supply or have in possession for supply plastic-stemmed cotton buds in Scotland.
cedr.ec/6bx

1 DECEMBER 2019

Invasive species

The Invasive Alien Species (Enforcement and Permitting) Order (Northern Ireland) 2019 introduces penalties and sanctions to implement the requirements of Regulation (EU) 1143/2014 on the prevention and management of the introduction and spread of invasive alien species.
cedr.ec/6bz

20 AUGUST 2019

Waste

The Environment Agency has issued guidance on low risk waste management activities that do not need an environmental permit. These Low Risk Waste Positions explain when you do not need to apply for an environmental permit for those activities, are reviewed regularly and can be subject to a change in enforcement.
cedr.ec/6c3

21 AUGUST 2019

Fluorinated gas

The Environment Agency and Defra have produced a series of guidance documents on the requirements for users, producers and traders of fluorinated gas (F-gas). They include specific guidance on using or servicing F-gas equipment, labelling F-gas equipment, banned F-gases and selling F-gas.
cedr.ec/6c1

22 JUNE 2019

Water

Natural Resources Wales is seeking views on the issues affecting Wales, Western Wales River Basin District and the Dee River Basin District. This will help shape the third River Basin Management Plan and the next state of Natural Resources.
cedr.ec/6br

6 AUGUST 2019

End-of-life vehicles

The European Commission is seeking views of the public on how well Directive 2000/53/EC on end-of-life vehicles is working and whether the rules it sets out are delivering the expected benefits for the environment.
cedr.ec/6bq

17 AUGUST 2019

Food

Defra is calling for evidence to help transform the food system in England by developing a National Food Strategy. It is relevant to food producers, processors, retailers, consumers, policy specialists, academics, farmers, factory workers and health care practitioners.
cedr.ec/6bp

Pretoria Energy Company (Arable) Limited was ordered to pay £45,648.50 over watercourse pollution at two separate sites

INCOURT

WATER POLLUTION

Fines over Fenland water pollution

Pretoria Energy Company (Arable) Limited, a company that produces feedstock for a sister company's anaerobic digestion plants, admitted causing pollution to watercourses in Emneth Hungate in Norfolk and Aldreth in Cambridgeshire. Both incidents were caused by silage liquor leaking from ag-bags and making its way into the watercourses. The ag-bags used by this company contained approximately 318 tonnes of silage.

On 7 February 2017, the Environment Agency was notified of watercourse pollution in Emneth. The attending officer found pollution caused by silage liquor escaping from eight ag-bags on the site, some of which had holes allowing the liquor to escape. They also discovered sewage fungus.

A Pretoria Energy Company (Arable) Limited representative said they would arrange to remove the ag-bags. However, when the officer returned to the site on 29 March 2017, all eight were still present and samples showed continued watercourse pollution. There was a further complaint in relation to odour, and on 19 July 2017, when the local council investigated, there were still five ag-bags present.

On 26 May and 30 May 2017 the Environment Agency received complaints for a site in Aldreth, Cambridgeshire. They found 14 ag-bags, eight of which had failed, but it was believed the liquor had not entered the watercourse. However, on a second visit on 1 June 2017, officers inspected the watercourse and discovered black, stagnant-smelling water and sewage fungus. Tests confirmed the water was harmful to the watercourse's biodiversity. The pollution was traced back to the ag-bags.

The company admitted causing pollution in both cases. At the Emneth incident, it tried to identify drains on the site and checked the ag-bags, but failed to pump out any of the silage liquor which ended up in the watercourse. It blamed extreme weather as a factor for the incident at Aldreth. Magistrates said the company had been reckless and ordered it to pay £45,648.50 in fines, costs and compensation.

CASE LAW

Thames Water appeal against £2m fine dismissed

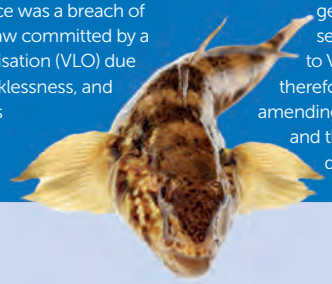
Thames Water Utilities Ltd appealed the £2m fine handed to it following a guilty plea to an environmental offence. The company was fined in December 2018 after it admitted causing pollution to a nearby brook.

The incident took place in 2015 after a malfunction in an operative pump. Although alarms highlighted the malfunction and staff were aware, no immediate steps were taken, and 82,000 litres of untreated sewage discharged into a brook, killing a number of bullhead fish.

When imposing the fine, the judge considered the company's previous convictions and fines, and its recklessness by failing to act. Thames Water argued the fine was excessive, and claimed the judge had failed to engage in the step-by-step exercise required by the sentencing guidelines, or to explain how he reached the figure of £2m.

The appeal court upheld the fine. It commented that, while the judge's sentencing remarks had failed to set out clearly how the fine had been reached and he had not engaged fully in the approach the sentencing guidelines set out, the same conclusion would have been reached regardless. The appeal court stated the offence was a breach of environmental law committed by a very large organisation (VLO) due to corporate recklessness, and thus the fine was not excessive or wrong.

Thames Water also asked the appeal court to note the difficulties faced by VLOs in assessing fines. It suggested an additional table should be added to the sentencing guidelines to provide ranges of fines for different categories of offence. The court stated it did not set out sentencing ranges by reference to figures because VLOs varied in size and nature. Consequently, the Sentencing Council had taken an informed decision to provide only general guidance for sentences in relation to VLOs. There was, therefore, no basis for amending such an approach, and the appeal was dismissed.



PHOTOGRAPHY: ISTOCK, SHUTTERSTOCK

OTHER NEWS

'Love Water' campaign launched

A campaign has been launched to encourage the UK public to help protect water resources for future generations. 'Love Water' is a campaign involving more than 40 environmental groups, charities, water companies and regulators; it seeks to raise awareness of the importance of water and the role everyone plays in protecting it.

Clean, healthy and accessible water is essential – not just for health and wellbeing, but also for economic growth. Population growth and the climate emergency are putting increasing pressure on the water environment. There is less available water in the UK than most other European countries, and the UK is facing hotter, drier summers and an increased risk of water shortages.

The average person in the UK uses 150 litres of water per day. 'Love Water' seeks to raise awareness of the small changes people can carry out that make a big difference. The campaign will feature events and initiatives, including beach and river clean-ups and various water saving projects, to engage the public and encourage them to enjoy water and the environment.

'Love Water' is also calling on businesses to get involved by promoting activities and pledging to save water and protect the environment by reducing pollution and waste. The campaign hopes that businesses will make water-saving and pollution reduction a part of their operational and corporate responsibility targets.

Michael Roberts, chief executive of Water UK, commented: "We all need to take action so that this country does not run out of water in the middle part of this century. Only by working together can we bring about the changes needed to ensure we have a resilient water environment now and in the future."

Changing of the guard

Diana Montgomery and ***Paul Leinster*** discuss how the sustainability profession has changed in recent years, and what IEMA's role will be going forward. Chris Seekings reports

After eight-and-a-half years as IEMA's chair of the board of directors, Diana Montgomery has handed the reins over to professor Paul Leinster CBE. During her tenure, Montgomery oversaw a number of changes to the profession that were driven by IEMA in its mission to transform the world to sustainability. Leinster takes over at a time of great uncertainty, with political instability in the UK and around the world threatening to reverse much of the environmental progress made in recent years.

With more than 60 years of experience in sustainability and environmental management between them, the pair catch up to discuss how the profession has evolved – and what IEMA's role will be as we move into the future.

Looking back

The sustainability profession has come a long way during the past decade, shifting focus from pollution prevention to climate change, environmental net gain, sustainable development and a whole range of other areas. However, this evolution was not always easy. "It is incredible to think we still had some semi-credible people doubting climate change when I first joined the board," Montgomery says. "That was only eight years ago – but that is a thing of the past, and the agenda has also got so much broader."

Leinster first started working in the environmental field in the 1970s, and recalls having a debate at the Environment Agency – where he was chief executive for seven of the 17 years he spent there – over whether a new strategy document should have a separate chapter on climate change. "Climate change wasn't on the agenda," he says. "The hole in the ozone layer was beginning to be, but there were only a handful of universities and polytechnics running environmental courses."

In the early days, there was also much discussion about what sustainability even meant. Montgomery, who until recently was the chief executive at the Construction Products Association, describes this as "unbelievable", considering the state of the profession today. Perhaps the biggest change, though, concerns the recognition that environmental and sustainability professionals now receive. Qualifications from IEMA give these workers a credibility that they never had before. "We are on the same track as accountants or marketers – sustainability is now a real profession," Montgomery says. "That is a huge change. Sustainability professionals are now mainstream, and IEMA members are some of the major catalysts. We can now influence everyone in the organisations we work for."

"We are on the same track as accountants or marketers – sustainability is now a real profession"

Providing leadership

Through its provision of qualifications, a professional skills map, and membership through to Fellowship, IEMA has really come into its own. The organisation was originally unclear in its mission, but its professional standards now make members indispensible to their organisations. "They need business and communication skills, and this is where the professionalism has helped," Leinster explains. "You need people who can present engaging, well-thought-out business cases and position statements at board level."

IEMA is also developing a Fellows network, which will lead the debate on a range of sustainability topics to ensure that members are consistently ahead of the curve. This leadership is also a big change. IEMA evidence and contribution is frequently referenced in the UK government's response to consultation, such as expertise on biodiversity net gain and waste management. And through the Broadway Initiative, IEMA has been instrumental in advising the government on Brexit and how it can safeguard environmental protections.

"IEMA has become clear about how it wants to transform the world to sustainability," Montgomery says. "We have created a process so that whether you are a member, associate or practitioner, sustainability is discussed at every level in your organisation."

Profitability is also a relatively new area of discussion within IEMA, and one that was subject to emotive debate just a few years ago. "The bottom line is that if you don't have profitable companies then they are not sustainable, because they will collapse," Montgomery says. "Now we have people with proper professional qualifications steering the debate, helping in terms of brand, performance and efficiency. It is no longer a 'nice to have' – you need sustainability professionals for your organisation to be successful."

And providing leadership is something that Leinster says will be vital going forward. "We have to be clear about what a professional membership body should look like and what it does in the 21st century. We provide training, CPD and resources for people of all organisations. They need to know that if you want to learn about sustainability, you should go to IEMA."

Troubled times

Leinster's new role as board chair comes amid political paralysis in the UK. At the time of writing, a general election appears imminent, and it is still unclear whether the UK will leave the EU with a deal – if at all. Brexit will be perhaps the biggest challenge for professional bodies during the next few years. "UK-based qualifications have standing throughout the world, and people look to our education and professional bodies system," Leinster says. "Whether they will continue to is something we need to explore; I think it depends on what happens to 'Brand UK'."

This period of instability could also be another opportunity to provide leadership. "Having a clear voice for sustainability and the environment during this period of potential turmoil, and making sure there remains a clear focus on protecting and enhancing the environment, is essential," Leinster says. "I think we can be that voice. Sustainability and the environment must still be taken seriously in organisations and government during this turbulent period, and we must still be seen as relevant."

The country's decision to leave the EU has already had a negative impact on IEMA. The body is currently petitioning for a Royal Charter, but Brexit has delayed the process. Expanding the membership of 14,500 has also proved problematic. "No matter how hard we have worked, however much our profile has been raised politically and in the media, we have still effectively flatlined when it comes to our membership," Montgomery says. "That is disappointing. How do we get to 50,000? Because at that point, we will have a significant number of professionals in organisations globally."

IEMA was initially very UK-focused, and the number of businesses and local councils that could afford environmental professionals was relatively small. "However, we now have members from all over the world, which is amazing," Montgomery says. "This is quite recent, and as that expands, that cap on our membership will hopefully be lifted."

PHOTOGRAPHY: AKIN FALOPE/PETER SEARLE

Another challenge is the number of members that are also members of other professional bodies. IEMA now faces questions over how best to partner with these organisations as traditional membership models change. "We need to be able to answer the question 'what's in it for me'?" Leinster says. "Explaining what we offer at different membership levels helps, and IEMA must continue to be a credible partner that provides a ready-made network of people who can provide support and expertise to each other for mutual benefit."

Reasons for optimism

Despite the challenges ahead, Leinster is excited by his new role. He was recently a judge for IEMA's inaugural Sustainability Impact Awards and was delighted by the level of talent on show. "The overall standard was very high, and there were people pushing the winners in all categories, which I thought was tremendous," he says. "It was not just businesses, but local authorities and public sector organisations such as the NHS engaging with corporate sustainability. I was greatly heartened."

The growing number of sustainability professionals reflects the views of wider society – the general public is now more engaged with the environment than ever before. "I think we are in a really good place," Montgomery says. "There is a greater understanding that the environment is important, social value is important and the corporates' role is important. People value brands for much more than whether they make a nice cup of coffee or not, so the opportunity is huge, and it has to go hand in hand with diversity and inclusivity. I think IEMA can be a bit braver."

Although the chair of the board is only constitutionally responsible for discharging the fiduciary duties of directors and supporting management, Leinster says he may look to develop the role. "One of the things I am interested in exploring is whether the board should be doing more to lead on some of the big policy issues," he says. "My term is for three years, so it's a matter of making sure we continue to work as effectively and efficiently as possible, but then also, for example, helping shape the climate change, net zero, environmental net gain and circular economy agendas. The board and the executive will explore how, through working together and with others, this can be best achieved."

He has all the tools needed to tackle these challenges. Montgomery shares how proud she is of the "extraordinary" board of directors she leaves behind, stating that their diverse skillset would be the envy of many other boards. Does she have any advice for Leinster? "It is something that comes so naturally to Paul, and I don't need to tell him that understanding and listening to the membership at every level is crucial," she says. "Fellows and members have a very powerful voice, but equally important are our students, associates and practitioners, so it is really important to challenge IEMA – because it's easy to assume you know what the membership wants, but you have to be actively listening all the time."

There are many reasons for optimism, even at this time of unprecedented political uncertainty, and Leinster describes it as a "great privilege" to help support IEMA members on their professional journey. "I expect that a number of them will be feeling quite uncertain just now, but we will be fighting to make sure our agenda is heard at the highest levels," he says. "The work our members do is incredibly valuable, and I would say to them, 'keep the faith, this is vitally important work you do'.

PEGASUS

Multi-Jurisdictional Legal Register Service

Take control of your Environment, Health and Safety Legal Compliance

See what Pegasus can do for your business

The Pegasus service delivers multilingual, multi-jurisdictional, customised legal registers to enable your on-going compliance with management standards, regulations and legislation.

10,000 Documents

8,000 Members

50+ Analysts

40+ Countries

Talk to us

To discuss your requirements with a member of our team get in touch:

+44(0)20 3287 4646 | info@pegasuslegalregister.com | www.PegasusLegalRegister.com

Trusted partner | Certified to: ISO 14001:2015, ISO 9001:2015, ISO 45001:2018, ISO 27001:2017

A new framework

Nick Blyth, **John Dora** and **Lesley Wilson** explain why it's so important for organisations to create adaptation plans – and introduce the new *ISO 14090: Adaptation to climate change* standard

As professionals, developing an organisational response to climate impacts can be a challenge. In 2013, IEMA members helped to develop guidance on how this business case can be made, with further guidance last year on climate action integration into an EMS/*ISO 14001*. This year, the British Standards Institution (BSI) is initiating the launch of an international standard that focuses on climate change adaptation, providing a framework through principles, requirements and guidelines.

Climate change is already starting to impact our way of life and economy. Supply chains (especially long ones) become vulnerable to weather events or changes in local temperatures or sea levels, which affect transportation or the supply of raw materials.

In the UK, we will experience periods with too much or too little water, increased average and extreme temperatures, and sea level rise. Health, wellbeing and high temperature issues will pose threats to productivity, and there is a risk of shortages in the water supply for public, agriculture, energy generation and industry uses, as well as impacts on freshwater ecology. In the UK, many risks and some opportunities are fully explored in the *UK Climate Change Risk Assessment 2017* evidence report.

Creating an adaptation plan

David Style, senior analyst on the Committee on Climate Change, has said: "It is critical that organisations consider the physical risks from climate change, as well as the opportunities in adapting to it. The climate is changing, and organisations that plan for this will increase their chances of future success, while those that do not risk being caught out."

Organisations need to look at their operations and identify climate risks that might affect them both now and in the future. They need to ask themselves: 'what's critical?'; 'over what timescales?'; 'what's likely to be affected by climate change?'; 'what information do I have about vulnerability?'; 'what information do I need about future climate hazards?'; 'how well are our decision-makers equipped to make good long-term decisions?'; and perhaps most importantly, 'who has responsibility for all this?'

IMAGES: ALAMY

Organisational impacts can be financial, physical, regulatory or reputational (how would it look if you couldn't deliver the service or goods that you've promised?). Through carrying out a review across the entire business, risks and vulnerabilities can be identified; these can then be addressed in an adaptation plan.

A good adaptation plan can make a big difference to operations, delivery and efficiency. An understanding of climate risk supports good decision-making around future objectives. The adaptation plan can include understanding the knowledge and experience contained within the organisation, considering stakeholders, identifying uncertainties, understanding impacts, creating actions and priorities, and harmonising with policies and objectives.

The plan can help to identify opportunities from climate adaptation, as well as risks. These might be improved suppliers, a new product, or a change in strategic direction for a business as it identifies a new market need.

ISO 14090

ISO 14090 was drafted by an international team of experts, convened by the UK's John Dora, FIEMA. At BSI, a team of experts from the UK's industry and government wrote comments on each draft. Originating in the UK and from BSI, the standard is in part a response to the need for climate actions called for in the Paris Climate Agreement and the UN's Sustainable Development Goal 13.

The new standard offers guidelines on how to bring climate adaptation activities into the mainstream, and can help organisations to identify, understand and reduce climate risk – particularly over long time periods. It provides a high level framework, guiding the user through key stages in the development of an adaptation plan.

The framework allows an organisation to address adaptation to climate change challenges at any stage of the adaptation process – whether it has a mature plan or has just started its adaptation journey. The process laid out is iterative in nature, and promotes learning and improvement to be fed into present and future decision-making.

> "The new standard provides a high-level framework, guiding the user through key stages in the development of an adaptation plan"

It is essential that an adaptation plan is adopted by leadership, and that its objectives and processes are integrated into the objectives and processes of the organisation. This is a requirement in *ISO 14090*.

Users of *ISO 14001 Environmental Management Systems* and *ISO 55000 Asset Management* will recognise many of the systemic organisational concepts used in *ISO 14090*, and will be able to use the standard to supplement their existing approaches to risk management and integrate climate change adaptation. *ISO 14090* also provides assurance to investors, insurers and customers that the organisation is aware of, and acting on, climate risks.

"Multilateral development banks are interested in the potential of standards such as *ISO 14090* for scaling up action on climate resilience across markets," says BSI committee member Sarah Duff, an associate in climate resilient investments at the European Bank for Reconstruction and Development. "Applying this framework approach in organisations ensures that the topic is incorporated into business plans and operations while allowing for tailored approaches in different sectors."

What next?

ISO 14090 is the first in a family of ISO adaptation standards, laying the foundations for subsequent standards that will be synergistic, supportive and harmonised. These will include *ISO TS 14092 Adaptation to climate change – Requirements and guidance for local governments and communities*, due to be published in in the fourth quarter of 2019, and *ISO 14091 Adaptation to climate change – Vulnerability, impacts and risk assessment*, due to be published in the first quarter of 2020.

Within the UK, and following a joint workshop with IEMA, BSI and Defra, BSI is now writing 'Decision-making for climate change: Adaptation pathways', a concept that is referred to in *ISO 14090* and which would fill a gap in detailed guidance where *ISO 14090* points the direction.

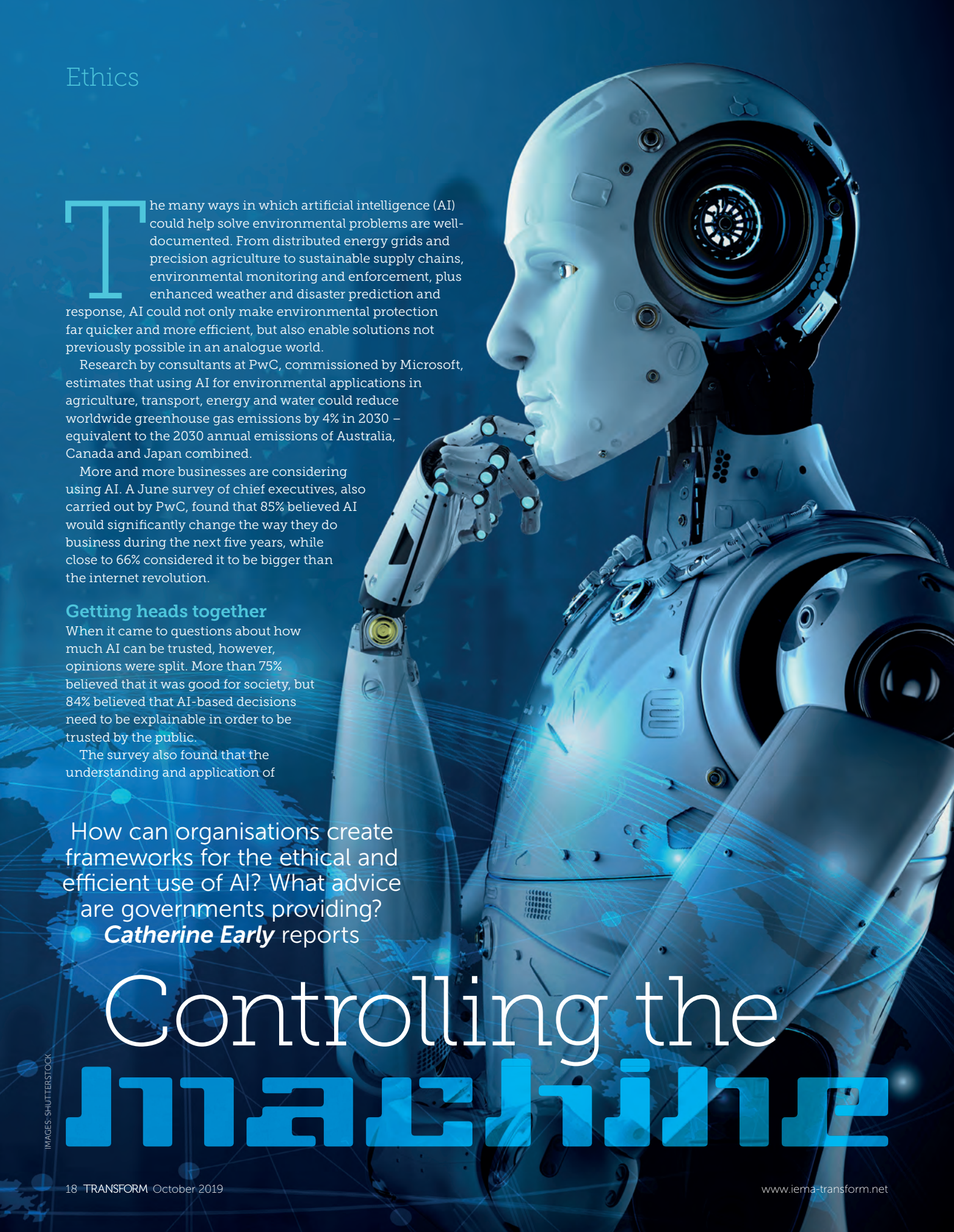
Climate change threats have never been so immediate, and organisations face huge challenges to manage its impacts and ensure business continuity. By using tools such as *ISO 14090* and the IEMA guide, organisations can enhance their business resilience now and into the future. *ISO 14090* is now available at a discount for IEMA members.

IEMA is continuing to work with BSI and ISO to develop further work in this area. IEMA policy lead Nick Blyth is vice-chair of ISO Task Force 7 on Climate Change Coordination, and is leading on new work on carbon neutrality at ISO.

Further information

- Read the *UK Climate Change Risk Assessment 2017* evidence report at **bit.ly/2uMriQR**
- IEMA members can access BSI materials at a discount at **www.iema.net/bsi-products**

NICK BLYTH is IEMA policy and engagement lead – n.blyth@iema.net
JOHN DORA, FIEMA is an international adaptation consultant and convenor of ISO 14090
LESLEY WILSON is lead standards development manager in sustainability at BSI



Controlling the machine

How can organisations create frameworks for the ethical and efficient use of AI? What advice are governments providing? ***Catherine Early*** reports

The many ways in which artificial intelligence (AI) could help solve environmental problems are well-documented. From distributed energy grids and precision agriculture to sustainable supply chains, environmental monitoring and enforcement, plus enhanced weather and disaster prediction and response, AI could not only make environmental protection far quicker and more efficient, but also enable solutions not previously possible in an analogue world.

Research by consultants at PwC, commissioned by Microsoft, estimates that using AI for environmental applications in agriculture, transport, energy and water could reduce worldwide greenhouse gas emissions by 4% in 2030 – equivalent to the 2030 annual emissions of Australia, Canada and Japan combined.

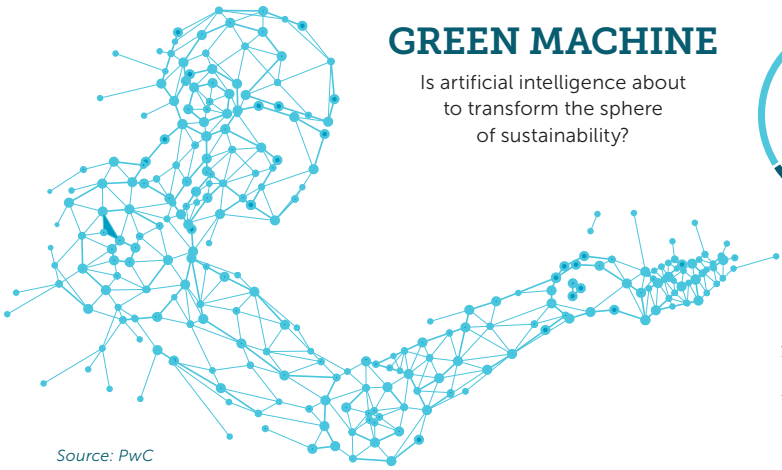
More and more businesses are considering using AI. A June survey of chief executives, also carried out by PwC, found that 85% believed AI would significantly change the way they do business during the next five years, while close to 66% considered it to be bigger than the internet revolution.

Getting heads together

When it came to questions about how much AI can be trusted, however, opinions were split. More than 75% believed that it was good for society, but 84% believed that AI-based decisions need to be explainable in order to be trusted by the public.

The survey also found that the understanding and application of

IMAGES: SHUTTERSTOCK

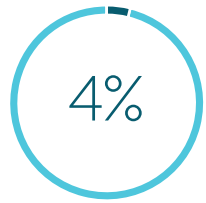


GREEN MACHINE

Is artificial intelligence about to transform the sphere of sustainability?

Close to 66% of chief executives consider the rise of artificial intelligence to be bigger than the internet revolution

85% of chief executives believe artificial intelligence will significantly change the way they do business during the next five years



Using AI for environmental applications in agriculture, transport, energy and water could reduce worldwide greenhouse gas emissions by 4%

Source: PwC

responsible and ethical AI practices among respondents varied significantly across organisations, and in most cases was immature. Some 25% had not considered AI as part of their corporate strategy, 38% believed that it aligned with their core values, and only 25% said they considered the ethical implications of an AI solution before investing in it.

In July, PwC launched a responsible AI toolkit. "We want to kick-start the conversation around issues such as data ethics and governance. A lot more needs to be done in this space," explains Ben Combes, co-founder of PwC UK's innovation and sustainability practice.

In such a rapidly developing technology landscape, the key for businesses is to establish a direction of travel for policy, and then see how things evolve in real time, he says. "We don't know how applications are going to evolve, but we also can't just leave everything and hope that it'll be okay."

Companies looking to use AI need to think carefully about who to involve across the company, in order to ensure that governance and policies are not developed in silos, he says. "Using AI is strategically important, so it needs the people who would be involved in core strategic planning, which is going to be a lot broader than only your technology or AI team."

The key is to consider all the angles, then work out who is needed to bring their expertise into decision-making. Companies could set up a steering group comprising a broad spectrum of business roles, with the technology team working on the day-to-day development, he suggests. Sustainability professionals absolutely need to be involved.

"We have big non-linear problems and we increasingly need big exponential solutions. AI, blockchain and other technologies are very much part of the toolkit, but we need to make sure that they're not making environmental and social issues worse. Environment and sustainability teams need to put themselves dead centre," he says.

> "AI is part of the toolkit, but we need to make sure that it's not making environmental issues worse"

A broad church

Lawyers are also giving attention to developments in responsible AI. Law firm DLA Piper established a dedicated AI team in May to support companies as they navigate the legal landscape of emerging and disruptive technologies, and help them understand the legal and compliance risks emerging from these technologies' creation and deployment.

Danny Tobey, co-chair of the firm's AI practice, agrees that companies need to include a broad selection of staff in the development of AI. "Everyone from the board and senior leadership team down needs to be involved. The whole point is that AI can reduce waste and inefficiencies and solve problems, but it really can't do that if your algorithms and data are broken up in silos," he says.

The risks of using AI vary according to industry, he says. AI needs to be trained on good data and applied in the right situations. It is also vital to consider data and algorithmic bias.

"One complication with environmental issues is the vastness of the datasets, which is going to push you towards black box solutions where the final model is not understandable to a human," says Tobey. "In situations like that, it's incredibly important to have people involved from the beginning who know what they're doing in AI and data science fields."

Many tools can be downloaded from the internet, and might then be used by a business without the right checks and balances in-house to use them properly. "That's where companies get in trouble. If you bring in a team from the beginning who have the right people involved, who understand the regulation and what that might look like in the future (because there are so many

on the horizon), then you're on a better footing." DLA Piper is on the defence counsel on a class action lawsuit alleging that AI produced recommendations for insurance that are contrary to regulations in certain states. "This case is at the forefront of the litigation that we're starting to see emerge, and I think there'll be a lot more of that," says Tobey.

Rules and regulations

Governments worldwide have been scrambling to draw up regulations on AI. According to Tobey, the US has some 21 proposed pieces of legislation on the technology. The UK government, meanwhile, has created the Office for Artificial Intelligence, the Centre for Data Ethics and Innovation, and the AI Council. These will work together to set up 'data trusts', to ensure that data governance is implemented ethically.

> "AI can't reduce inefficiencies and solve problems if your algorithms and data are broken up in silos"

The European Commission is also scrutinising the sector. In June 2019, it published a report entitled *Policy and investment recommendations for trustworthy Artificial Intelligence*, which concerns how AI can be made trustworthy. It includes a recommendation to ban its use in certain cases, such as mass-scoring of individuals, and to implement very strict rules on surveillance for security purposes.

Other organisations have been incorporating ethics into their work on AI. Think tank E3G is calling for the government to create an 'International Centre for AI, Energy and Climate', which should consider responsible application of the technology as one of its core functions. Industry body Tech UK has been considering digital ethics more broadly, and will hold its third annual summit on the subject in December.

Time will tell whether the rise of AI will be "the best or the worst thing ever to happen to humanity", as the late professor Stephen Hawking warned. Larissa Bifano, who also co-chairs DLA Piper's AI practice, is optimistic. "It's really about mitigating any risk that could come from a malfunction or a poorly programmed piece of AI. As long as there's input from regulators and companies implement AI thoughtfully, it should be a win-win for everyone."

Further reading

- Read the European Commission's report *Policy and investment recommendations for trustworthy Artificial Intelligence* at **bit.ly/2J7Qpnu**
- Download Tech UK's paper *Digital ethics in 2019: Making digital ethics relevant to the lives people lead* at **bit.ly/2SsFE1I**

CATHERINE EARLY is a freelance journalist.

Principles for establishing rigorous AI governance

- **Establish a multidisciplinary governing body** – companies should consider establishing an oversight body, with representatives from a range of different areas.
- **Create a common playbook for all circumstances** – each application of AI will have its own risks and sensitivities that require different levels of governance. Governance structures should, therefore, cater to many possibilities, acting as a 'how to' to approach new initiatives.
- **Develop appropriate data and model governance processes** – data and model governance should be considered in tandem.

For data, there should be a clear picture of where the data has come from, how reliable it is, and any regulatory sensitivities that might apply to its use. It should be possible to show an audit trail of everything that has happened to the data over time.

For models, standards and guidelines should be drawn up to ensure AI applications are suitable and sustainable for their intended use, and do not expose the business to undue risk.

Source: PwC

A GROWING REVOLUTION

Chris Seekings investigates the many ways that agritech could be about to transform farming and food production

Agriculture is going through a technological revolution. A vast amount of untapped data is now available to farmers, while new growing methods are disrupting the way food has been produced for millennia. With the UN warning that food production will need to rise by 70% by 2050 as the world's population surpasses nine billion, this could not come at a better time.

A handful of 'agritech' start-ups are leading the charge, boosting energy efficiency and slashing food, water and CO_2 waste using artificial intelligence and robotics. These innovative techniques could herald a new era for crop farming, and offer solutions to the pressing environmental challenges we face.

Data disruption

Sustainability is a significant challenge for agriculture and horticulture – poor farming practices, unstable weather patterns, pests, disease and food prices all contribute to waste, and scientists expect crop losses to rise by up to 25% for every degree of global warming.

Part of the problem is that farmers have traditionally found it hard to extract meaningful insights from the data they gather. However, wireless smart sensing technologies now allow growers to monitor climate, soil moisture, energy use, carbon emissions and crop levels in real-time.

Amsterdam-based company 30MHz is at the forefront, taking advantage of a data-rich sector that is primed for disruption. "Agriculture is responsible for 70% of global freshwater usage, and is the world's second-largest CO_2 emitter after the energy sector," says the company's marketing vice president Niels Lauwers. "With technology and data, organisations of any size can innovate to become more efficient."

Farmers can monitor and manage their crops through 30MHz's ZENZIE dashboard, which provides updates through graphs, heat maps and custom alerts on phones or tablets. "At the centre of this is the grower, who will be empowered to grow more using less resources," Lauwers explains. "Our customers are able to use less water, energy and fertiliser while optimising output."

One customer is agricultural production company Wengfong Nurseries, a large propagator in Malaysia. After switching from handheld sensors to 30MHz's wireless technology, the firm cut its fertiliser use through humidity and sunlight monitoring, achieving a return on investment in less than a calendar year.

"Crop strategies will one day be fully based upon data insights," Lauwers says. "Combined with a vast increase in measurement options, artificial intelligence and machine learning, it will become an autonomous operation."

ILLUSTRATION: OLIVIA CHANCELLOR, PHOTOGRAPHY ©GEOFF PUGH TELEGRAPH MEDIA GROUP LTD.

Sam Watson Jones, Andrew Hoad and Joe Allnutt of The Small Robot Company with prototype Harry robot

Prototypes for The Small Robot Company's Tom robots

Rise of the robots

It is not just wireless sensors and dashboards assisting farmers with data collection and cultivation. The Small Robot Company has been deploying miniature robots for precision agriculture, replacing the traditional role of tractors and farmers. These can monitor hectares of land with minimal pressure on soil, collecting data on every single plant or blade of wheat and surrounding biodiversity. They then suggest and carry out remedial action, only feeding and caring for the plants that need it. This reduces waste, pesticide use and soil degradation.

"This will entirely change what's possible on the farm, and how we think about farming," says Small Robot Company co-founder Sam Watson Jones. "When we can not only understand a farmer's field on a plant-by-plant basis, but also take action at that level, a completely different farming system becomes possible. Farming will be able to produce an abundance of food with minimal negative environmental impacts."

These autonomous robots use up to 95% fewer chemicals and 90% less energy than traditional tractors, can work 24 hours a day, and avoid crushing worms or destroying hedgerows and other biodiversity. Increased yield and minimal chemical use can boost revenues by up to 40% and cut costs by 60%.

Meanwhile, drone specialists have been able to collect valuable data through aerial surveys, identifying poor drainage areas, crop health and weed pressure. Although used mainly by agronomists rather than farmers, these assessments have also allowed for significant productivity and sustainability gains.

"Drones and swarm robots – small, simple and inexpensive – are poised to reverse the trend in agriculture towards ever bigger machines," Agri-Tech East's Dr Belinda Clarke says. "These little workers behave autonomously, interacting with each other and the environment to achieve the desired outcome.

"Many of these technologies are being pioneered or supported by farmers themselves. The benefits include less damage to soil structure, and novel insights before issues can be seen with a naked eye and at greater scale and speed."

> "Drones and swarm robots are poised to reverse the trend towards bigger machines"

Growing through change

Another development involves advancements in hydroponic and aeroponic indoor growing. Hydroponic methods do away with soil and grow plants in a reusable solution, using up to 20 times less water than soil-based gardening and negating the need for pesticides.

Aeroponic methods take this one step further. Developed by NASA scientists in the 1980s to grow plants in space, aeroponic methods remove soil and water, instead suspending plants in a nutrient-dense mist. This addresses many of the issues that have held back indoor farming for years.

"A common misconception about plants is that they only 'breathe' through their leaves, but part of the oxygen and CO_2 they use is also absorbed through their roots," says India Langley, communications lead at agricultural engineering firm LettUS Grow. "By suspending our plants' roots in mist rather than water, plants can respire optimally during their whole lifecycle because they are not submerged. Using this system, we've seen up to a 70% increase in crop yields over hydroponics."

LettUs Grow claims that its aeroponic methods use up to 95% less water and fertiliser than traditional field farming, and emit 90% less CO_2 than hydroponics, addressing challenges related to water security, soil degradation and biodiversity loss. Conventional farming, grazing of livestock, mining and drilling combined are estimated to account for more than half of all deforestation worldwide.

Another advantage, which applies to indoor farming in general, is that crops can be grown year-round, eliminating

the risk of harvest failures caused by extreme weather. "Soil-based farming can be so weather-dependent, with many unforeseen costs to keep the operation alive," Langley tells me. "Take the current 'cauliflower crisis' – farmers across Europe have lost whole harvests of brassicas because of the extreme weather."

Growing year-round without impacting the quality of crops also reduces the need to import from other countries, cutting carbon emissions. Moreover, an estimated 900,000 tonnes of food is wasted every year in UK supply chains alone. "When bought in season in the UK, the CO_2 equivalent emissions for an 80g serving of strawberries is 136g; when flown in out of season, it's 408g," Langley explains. "That's a 200% increase in greenhouse gas emissions, and also leads to a huge amount of food waste."

Breaking down barriers

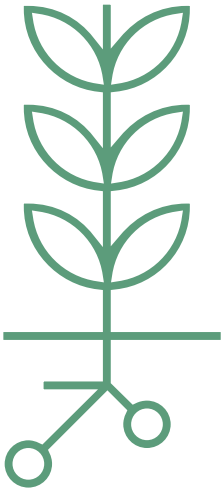
The Food and Agriculture Organization (FAO) believes arable land will have to expand by around 120m hectares in developing countries to feed a growing population, but expects this to actually decline by around 50m hectares. An advantage of indoor growing is that it allows for vertical farming, with plants grown in stacks on a small footprint. This has led to suggestions that skyscrapers could be used to grow crops, reducing land use.

However, it is mainly leafy greens that are currently grown in vertical farms; the prospect of growing wheat and rice seems a long way off. "We are never going to see commodity crops being grown in this way, but for some crops in some areas of the world, it is a potential game-changer," Dr Clarke says. "I don't see it replacing broadacre production, but it is providing alternative options when the costs, conditions and markets are right."

There is also the issue of energy use. LED lighting has helped address this in some ways, but supplying energy at a suitable cost for larger-scale facilities is still a major challenge. Additionally, there is often a large upfront capital investment for indoor growing and aeroponic methods – another limitation. "But the return on investment is so much greater because we can produce higher yields with much less space, using fewer resources and with significantly less waste," Langley says. "We can also contribute to nutritional value, flavour or appearance by changing lighting, irrigation, nutrients and the environment. We can play with every single level to get more nutritious, tasty or 'beautiful' foods than you would typically get from soil."

Some farmers, she says, have been put off aeroponic methods because most systems produce their mist through nozzles that clog up with salts and nutrients, in much the same way as limescale forms in kettles. "We have developed a system without any nozzles, so there is nothing to clog and break," Langley explains. "Our farm management software is breaking down barriers-to-entry for indoor farming and aeroponics."

> "Increasing the resilience of the system is crucial for the sake of the planet"

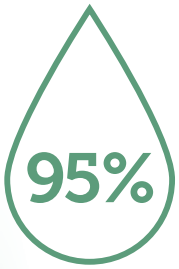


SMART FARMING

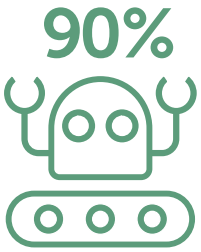
How technology is increasing efficiency in agriculture

Hydroponic methods grow plants in a reusable solution, using up to 20 times less water than soil-based gardening

20x



LettUs Grow claims its aeroponic methods use up to 95% less water and fertiliser than traditional field farming



The Small Robot Company's autonomous robots use up to 95% fewer chemicals and 90% less energy than traditional tractors

Sustainable future

From miniature robots scurrying through fields for precision agriculture, to growing crops without soil or water, the potential impact of agritech appears limitless. There have also been significant improvements in the traceability of products through blockchain technology, with customers now able to access encrypted data on the origins of food simply by scanning a unique QR code. "Agriculture sits at the very pivot of the climate change agenda," Dr Clarke says. "Increasing the resilience of the system is crucial for the sake of the planet, and for the future of the industry as well."

Aside from advances in genomics, she explains that the greatest developments in agriculture arguably involve precision farming and the harnessing of technology for predictive yield models or to spot disease. The development of standards such as ISOBUS and ISO 11783 will be crucial to overcome challenges facing the sector. "We still have a long way to go. Ensuring that we have connected agritech is a critical step in farmers being able to integrate the wealth of data coming from across the farm and to convert it into actionable insights," Dr Clarke adds.

The UK is among the leaders in agritech, but there are exciting technologies emerging in Israel, Silicon Valley and other EU countries, too. How will agriculture look in 20 years, or beyond? "It is so difficult to tell – just think about what has happened in the last 20 years!" Langley tells me. "But 'business as usual' is no longer an option. We need to think outside the box, and this is where entrepreneurship and tech are real assets to agriculture."

A shift towards controlled agriculture seems increasingly likely, and solutions to water and food waste, traceability, pesticide use and energy efficiency will only grow and grow. "Whatever happens, it is going to need to be driven by sustainability," Langley says. "Luckily there are some amazing companies out there tackling these issues from all angles."

For the record

Dorry Price discusses how blockchain could help the UK transition to a low-carbon economy

Blockchain is among the most hyped technologies in recent memory. With climate change on the agenda of many governments and businesses, can it help to decarbonise the way we live and work?

Blockchain employs shared databases, sometimes referred to as 'distributed ledgers', to record and verify information in a decentralised manner. Data is recorded in a shared database by a network of devices – or 'nodes' – that independently timestamp the data and verify that it matches data placed by other nodes. Once these nodes are aligned, the data is recorded in the database – a new 'block' is added to the 'chain'.

The technology allows transactions between different parties to be conducted safely and reliably, without intermediary agents. Importantly, it exhibits:

- **Immutability:** data is permanently recorded and no data can be altered without creating a new block
- **Reliability:** transactions are completed through a decentralised verification mechanism, allowing peer-to-peer transactions to be safe and reliable without the need for intermediary agents
- **Efficiency:** transactions only complete when necessary conditions are verified as having been met (for example, that the seller of an asset actually owns the asset), which prevents errors and reduces costs.

Blockchain has already been used in sustainability-related applications (as in a tool for embedding component traceability in textile supply chains), and with attention turning to accelerating the UK's transition to a low-carbon economy, there are opportunities for blockchain to be used in the following ways:

1. Improving information on emission reductions. International climate change action relies on countries upholding their commitment to meet emission reduction targets, such as those mandated by the Paris Agreement. With blockchain, each country's progress against those targets can be maintained, verified and made accessible to the public. The reliability and transparency of such information could help to hold governments more accountable for their commitments.

2. Streamlining renewable energy trading. Blockchain is being used in small-scale renewable energy grids to manage data on energy production and battery storage capabilities in real-time. This makes the grid more efficient and flexible, and should lower the cost of supplying renewable energy. LO3 in New York and Verve in London are two start-ups putting this technology into practice. Electronic 'smart' contracts can also use it to facilitate instant pricing and trading in response to supply and demand fluctuations.

> "Progress against targets can be maintained, verified and made accessible to the public"

3. Improving the accounting and reporting of greenhouse gas emissions. Emissions accounting typically involves manual data collection, processing and verification – particularly for projects in remote locations. Blockchain could ensure that carbon footprints are more accurately calculated by recording information in real-time, avoiding double counting and enabling tamper-proof data transfers. It can also track embodied carbon emissions in large-scale infrastructure projects, transferring records through construction, operational and decommissioning phases. This could increase the reputability and transparency of these projects and reduce project costs.

While blockchain's applications could be game-changing, the technology is still in its infancy. Large-scale applications are still at pilot stage, and more examples of success are required before many businesses and governments will be ready to commit. However, if blockchain continues to gain traction, it could be an exciting example of how technology can accelerate the low-carbon transition.

DORRY PRICE is a sustainability consultant at WSP and sits on the IEMA Futures Steering Group.

IMAGES: ISTOCK

Zeroing in on FLARING

Harshit Agrawal looks at efforts to reduce the wasteful practice of 'gas flaring' during oil production

Wherever we live, we depend on energy. As global living standards improve, driven by growth in India, China and other places in Asia, global energy demand is expected to grow by around 30% by 2040. However, in order to tackle climate change, we need to emit much less carbon dioxide. Our biggest struggle may well be this dual challenge: increasing energy demand on one hand while reducing energy industry emissions on the other.

Reducing associated gas flaring during oil and gas production is a win-win solution that would help to tackle this dual challenge. Billions of cubic meters (bcm) of natural gas is flared annually at oil production sites around the globe. Flaring gas wastes a valuable energy resource that could provide energy to support economic growth and progress. Gas flaring also contributes to climate change, releasing millions of tons of CO_2 into the atmosphere.

What is associated gas flaring?

During oil production, associated gas is produced from the reservoir along with the oil. Due to a range of technical, regulatory, and/or economic constraints, this associated gas is flared, rather than used for productive purposes or conserved.

While oil can easily be transported using tankers or pipelines, associated gas requires the installation of large compressors and expensive infrastructure for its proper use. In the absence of such infrastructure, the gas is typically burned at the site from an elevated or horizontal stack, called a flare.

An estimated 145 bcm of associated gas was flared globally in 2018, which is equivalent to the total annual gas consumption of Central and South America. If this amount of gas were used for power generation instead, it could provide about 750bn kWh of electricity. Associated gas flaring is a monumental waste of a valuable natural resource.

Zubin Bamji, programme manager of the World Bank's Global Gas Flaring Reduction (GGFR) Partnership, considers the reduction of gas flaring reduction to be "low-hanging fruit" in the global climate action plan. "Oil-producing countries can and should address their routine flaring through effective regulation and political will," he says. "Those are key ingredients. And GGFR and the World Bank stand ready to assist governments in finding solutions, whether technical, regulatory or financial."

GGFR was created in 2002 at the World Summit on Sustainable Development in Johannesburg, South Africa. The Partnership is comprised of governments and oil companies, which are working to end routine flaring by helping to develop country-specific gas flaring reduction programmes, conducting research, disseminating best practices and raising awareness. During a recent GGFR meeting in Milan, Italy, Bamji noted that after years of decline, gas flaring had risen in 2018 due to a sharp increase in oil production and political conflict in oil-producing countries that were unable to address their gas flaring. However, he added that GGFR remains hopeful: the long-term trajectory during the past decade has been downward, and GGFR Partner governments and oil companies do much better at reducing flaring than the rest of the world.

Zero routine flaring

In April 2015, the World Bank and GGFR launched the Zero Routine Flaring by 2030

IMAGES: ISTOCK

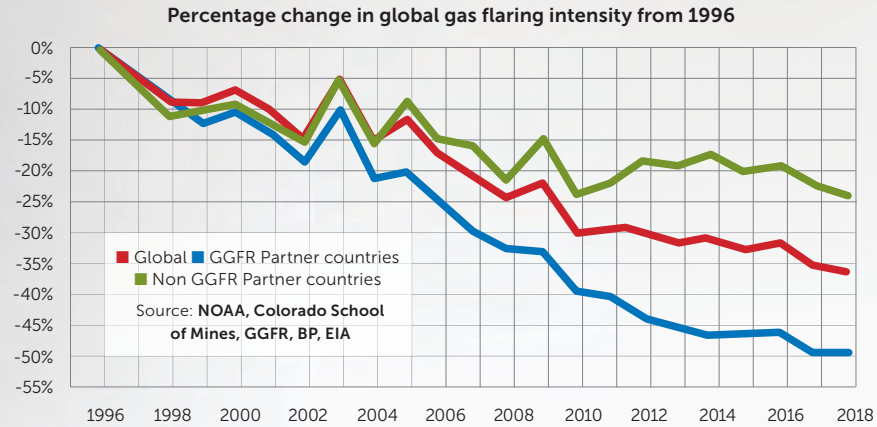
initiative, which commits governments and oil companies to a) not routinely flare gas in any new oil field development, and b) end routine flaring at existing oil production sites as soon as possible – and no later than 2030. Currently, 32 governments, 36 companies and 15 development institutions have supported and endorsed the initiative, covering well over 50% of global flaring. The global initiative has already catalysed action to end routine flaring, with oil-producing countries such as Nigeria, Ecuador, Egypt and Mexico developing robust associated gas monetisation and utilisation programmes.

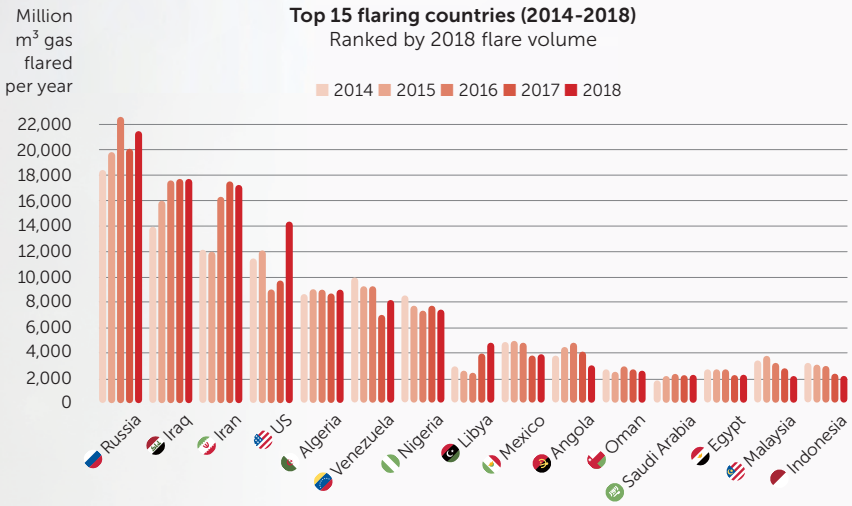
The World Bank team compiles the total volume of gas flared by countries on an annual basis, based on advanced sensors on a satellite that was launched in 2011. In 2018, the top global flaring countries were Russia, Iraq, Iran and the US.

In US, gas flaring rose by about 48% between 2017 and 2018, and oil production jumped by 33%. Satellite data indicates that increased flare volumes were concentrated almost exclusively in the shale oil basins in North Dakota's Bakken formation and Texas's Permian Basin and Eagle Ford Group. Similarly, countries struggling with conflict experienced an increase in gas flaring. In Venezuela, gas flaring soared even as oil production declined sharply, indicating a state in crisis – similar to trends seen previously in Syria and Yemen.

ASSOCIATED GAS FLARING

Putting an end to a wasteful practice





Source: World Bank / GGFR **www.worldbank.org/en/programs/gasflaringreduction**

Is it achievable?

Effective and timely reduction of gas flaring will require a sustained, multi-pronged approach, involving close collaboration between governments, the oil and gas industry, and technology providers. In many countries, the right government regulations and policies can create the necessary incentives to harness, monetise and use the flared gas. In recent years, new technologies that utilise associated gas have also emerged; these include flared gas-to-power, using micro-turbines, and modular and skid-mounted flared gas-to-liquid technologies. The selection of the most appropriate gas utilisation option is however, greatly influenced by the volume and quality of the gas resource, its location, and capital costs.

Bamji says GGFR's strategy has shifted over the years to reflect the changing industry landscape. The Partnership is now more focused on enabling governments to develop the capacity, regulations, infrastructure and markets for associated gas utilisation. With more than 80 governments, oil companies and development institutions committed to this initiative, we have a solid foundation to end this 160-year-old industry practice during the next 10 years. However, we must accelerate efforts and invest in the necessary infrastructure, technology and markets if we are to achieve this goal.

> "An estimated 145 bcm was flared globally in 2018, which is equivalent to the total annual gas consumption of Central and South America"

Further reading

For more information on the Zero Routine Flaring by 2030 initiative and the latest satellite flaring data, visit **www.worldbank.org/zeroroutineflaring**

DR HARSHIT AGRAWAL, CEnv FIEMA is senior climate change and air emissions advisor at Petroleum Development Oman.

The Landfill Diaries

The UK will fall short of the EU target to recycle 50% of waste from households by 2020 – we're stuck at around 45%. However, we are on track to meet another target: that no more than 35% of biodegradable municipal waste (BMW) will be landfilled by 2020 (against a 1995 baseline). The latest data, published earlier this year, put us at 21% in 2017.

However, this means huge amounts of BMW are still being buried in the ground – 7.4m tonnes in 2017. There, it breaks down anaerobically, generating methane, which is 25 times more potent than CO_2 and accounted for 11% of the UK's greenhouse gas inventory in 2016).

In 2019, it seems foolish to rely on holes in the ground for managing our waste. Almost half the municipal waste sent to landfill is biodegradable – food, paper, garden waste and so on. These are valuable resources. In its resources and waste strategy, the government promised to "explore policies to work towards eliminating all biodegradable waste to landfill" by 2030 – the date by which it also wants no food waste to end up in landfill.

Mandatory food waste collections – also promised in the strategy – will help, and policymakers have threatened to "consult on banning biodegradable material being sent to landfill". It's an attractive solution: the most successful countries in terms of recycling tend to be those with landfill bans, and bans provide security for investors in technology such as anaerobic digestion. However, this is no silver bullet.

"Landfill bans are blunt instruments and care has to be taken to ensure that they don't simply lead to a switch from landfilling to incineration," Dominic Hogg, chair of sustainability consultancy Eunomia, told me back in 2011. Scotland had, by then, already committed to a BMW landfill ban as part of its Zero Waste Plan. On 9 May 2012, the Waste (Scotland) Regulations 2012 were passed in Scottish parliament; by 1 January 2021, BMW will be banned from landfill.

With less than 18 months to go, Hogg's prophecy looms large. Eunomia research shows that 2.05m tonnes of waste will be subject to the ban, but almost half won't have a home. If recycling and reduction targets are met, Scotland will face a 'capacity gap' of 1.01m tonnes; if not, it could face a 1.28m-tonne problem. Only 14 councils, representing 55.5% of residual household waste (774,000 tonnes), will be ready.

"IN 2019, IT SEEMS FOOLISH TO RELY ON HOLES IN THE GROUND FOR MANAGING OUR WASTE"

It's a costly oversight – economically, environmentally and politically. There is no chance of adding additional energy-from-waste (EfW) capacity in time, for example, so waste may have to be sent to England or overseas. This will bump up carbon emissions and costs (the bill could reach £1.1bn in the period 2021-2030), and goes against the spirit of the ban – the preservation of resources.

The other option is to extend the deadline while further capacity is built (the irony here being that the Scottish government is, by and large, anti-EfW). Some have speculated that this is what will happen; there's been no decision yet, leaving landfill operators on tenterhooks. Ministers in Westminster will be watching the fallout closely: the Committee on Climate Change has just called for a UK-wide BMW-to-landfill ban by 2025, a decade earlier than the UK government wants. If an eight-year lead-in to divert two million or so tonnes is tough, imagine six years and more than seven million tonnes?

That doesn't mean it's not worth trying, provided the goal is preserving resources rather than fuelling incinerators. Ministers in Scotland maintain that everyone had time to prepare. However, they seem to have set the deadline and then put their heads in the sand, hoping the deadline would be enough to ensure industry and councils sprung into action. It wasn't.

If the idea of a ban tickles the fancy of new environment secretary Theresa Villiers, she may want to consider that setting a ban is the easy bit – the hard work comes in developing the policies to deliver it.

DAVID BURROWS is a freelance journalist.

IMAGES: SHUTTERSTOCK/ISTOCK

Success breeds success

The winners of IEMA's inaugural Sustainability Impact Awards were announced at a lunchtime celebration in London. Chris Seekings reports

More than 400 sustainability professionals from around the world gathered for a sparkling lunchtime reception at IEMA's inaugural Sustainability Impact Awards last month.

And what a celebration it was, with attendees treated to an afternoon of food, music, laughter and cheer amid jubilant scenes at The Brewery in London.

The timing of the ceremony could not have been better, with millions taking to the streets on the same day to protest against government inaction on climate change globally.

After enjoying a welcome cocktail, guests made their way to the dining hall for opening remarks from IEMA's CEO Tim Balcon, who was full of praise for the talent on show.

"At these awards we remind ourselves of the thousands of people who work day in, day out to find new solutions in response to the climate and environmental emergency – our work has never been more important and more relevant than it is right now," Balcon said.

"Not everyone in this room will be taking home a trophy, but it is a tremendous achievement to have been shortlisted, and I stand in awe at our members' work."

Guests were served a stunning three-course meal crafted from locally sourced ingredients, before being introduced to the host , comedian and environmental economist, Matt Winning.

A side-splitting act ensued, with Winning – also a professor at University College London – well aware of the difficulty of combining environmental breakdown with comedy.

"The recent strikes are incredibly inspiring and a wonderful thing. For years we have been telling people climate change is going to affect their children, and now it is the children protesting. My only issue with it is that they called it the youth strike and not the minors' strike – wasted opportunity."

Then it was time for the awards. Nineteen winners were announced throughout a high-tempo ceremony, celebrating organisations big and small, and individuals with careers spanning five to 25 years.

The first award went to Arriva Rail North, with the company's Hearts and Minds Engagement campaign coming out on top in the Workforce Development category. The campaign trained more than 5,000 frontline staff, and saw 400 managers go through a certified two-day IEMA course.

A visibly ecstatic Kyle MacNeil, environment business partner at Arriva Rail North, said: "IEMA has been brilliant, everyone could relate to the framework we were given and it gave us all the information we needed. We are absolutely thrilled to have won, and I am sure these awards will keep dragging people to do the right thing for the environment."

On to the Sustainable Finance category, in which WHEB Asset Management took home the award for its comprehensive sustainable investment strategy. "There was really good competition today, and I am really thrilled and honoured to receive this award," said head of research Seb Beloe. "I had no idea that today's event would be on this scale, and it is fantastic to celebrate the work being done and to give winners a profile. We are moving towards a low-carbon economy, and if you don't understand the benefits of good investment and decision-making you will miss out – it's not just an ethical thing."

It was then time to celebrate the achievements of Wilson Power Solutions, which won the New Product, Service or Technology category for its Wilson e2 Amorphous Transformer. "We are not a massive company, so being recognised for our work is superb," said managing director Erika Wilson. "We are now celebrating our 1,000th sale, it's just incredible – and obviously reducing carbon for everybody."

The winners were announced at an expeditious pace, and it was soon TAG Farnborough Airport's turn to receive an award for its entry to the Energy and Carbon Transition category. The site was the world's first business aviation airport to achieve carbon neutral status, and a worthy winner. "I am absolutely delighted – there was some serious competition in our category, so this is a bit unexpected, but we are really pleased," said environment manager, Miles Thomas, PIEMA. "Reaching the carbon neutral goal was a huge milestone, and these awards raise awareness among other companies, and allow others to see what can be achieved."

The Environment Agency finished top of the pile in the Construction and Infrastructure Project category for its flood alleviation scheme in Port Clarence and Greatham South. The project delivered a vast array of sustainability benefits in addition to flood risk mitigation. "We are really passionate about this, and it is great for our team to get this recognition," said Emma Morrish, Environment Agency principal environmental project manager. "I am very surprised, but collaboration and building partnerships has made our job a lot easier. These awards give people a platform, and show what is possible if you think outside the box."

It wasn't long before the individual awards were announced, along with the winner of the Best Volunteer Contribution category. David Hoare, associate director at WSP, was honoured for his volunteer work on IEMA's North West Regional

"Our work has never been more important and more relevant than it is right now"

TIM BALCON

"This award gives us confidence that we are working against an international benchmark"

DR WADDAH GHANEM AL HASHMI

Steering Group, helping to engage members with policy, and was clearly emotional at the achievement. "I am stunned really, it's fantastic," Hoare said backstage. "I know it sounds clichéd, but this really is an award for all the volunteers in the network groups, the various specialist groups, and all the people who put in a load of their free time – what would we do without them?"

Next up was the award for the Future Sustainability Leader category, picked up by Samantha Carlsson, senior sustainability consultant at Hoare Lea. She impressed the judges after being shortlisted for the CIBSE Graduate of the Year and passing exams to become a BREEAM and WELL Accredited Professional. "There were some great people shortlisted in my category, so I am delighted," Carlsson said. "I have always been interested in what we can do to save the world. Working at an engineering company in the built environment is one way to do that, and I hope to inspire others."

Dr Waddah Ghanem Al Hashmi took to the stage to pick up the Sustainability Leader award for his more than 22 years of experience driving sustainability practices at the Emirates National Oil Company. "I feel very privileged to win this award, and it must have been tough as I heard I was competing against over 100 people," he said. "We have been doing a lot of work, especially in the Middle East, so it was important to benchmark our actions against what others are doing around the world. This award gives us confidence that we are working against an international benchmark, and I am very happy and very pleased."

The final award of the night went to the Foreign and Commonwealth Office for its entry in the Best Team category, with the winners demonstrating a global reach with its #BeyondPlastic Taskforce. Its overseas embassies have saved more than one million items of single-use plastic annually, with 32 having committed to dates by which they will have declared themselves free of avoidable single-use plastic. "This is recognition of a team collaboration," said head of sustainability Alex Hilton, CEnv. "We've got a global network of 100-plus volunteers with 267 posts across the globe, so it is really great to be able to share our success with people across the world."

The winners took to the stage for one final photograph together, before returning to their seats to continue the celebrations. As the event drew to a close, there was a clear sense of achievement and camaraderie in the air, with everyone keenly aware that they are all working together for a far greater prize than any one trophy.

"I have always been interested in what we can do to save the world, and I hope to inspire others"

SAMANTHA CARLSSON

CONNECT

SOCIAL AND COMMUNITY NEWS FROM IEMA

NORTH OF ENGLAND

What's the buzz about Pollinator Parks?

Climate Action North's project aims to boost pollinating insect numbers – vital for the environment and food production

An initiative to support the survival of pollinating insect populations such as butterflies and bees on industrial and retail parks throughout the North of England is open for business.

Led by community interest company Climate Action North, the Pollinator Park Project sees the planting of native British 'pollinator-friendly' wildflowers on land that would otherwise be left unused.

Scientific evidence shows that insect numbers around the world are declining at an alarming rate, with bees, ants and beetles disappearing eight times faster than mammals, birds or reptiles.

Climate Action North managing director Sharon Lashley said: "Bees, butterflies and other pollinating insects are vital contributors to the beauty of our landscapes and our economy. The decline of pollinating insects will affect the health of our £100bn food industry, which is at the heart of our economy.

"The functions performed by pollinating insects are believed to be worth £690m each year to the UK's economy alone, and without this service, some of our food will become a lot harder to grow and more expensive."

The Pollinator Park project was launched at the Business Innovation Centre (BIC) in Sunderland in March 2019, and incorporated pollinator-friendly wildflowers such as red campion, moth mullein, primrose and dandelion.

David Howell, operations director of the BIC, said: "We're very proud to host the first garden as part of this worthy project, which is not only helping to provide a pleasant outside area for our tenants but also contributing to a more sustainable environment. The area has already transformed into a haven for wildlife and a number of pollinator species have been spotted, which is fantastic to see!"

If you would like to take action and get involved with the Pollinator Park Project, contact Sharon Lashley at sharon@climateactionnortheast.org.uk

QUOTE UNQUOTE

Great to see education relating to #ClimateEmergency referenced in @IEMA_Transform and a description of @uncclearn. It's a great project. But please be reassured... learning DOES take place in schools relating to the environment already. This will give it a good boost though. #SDGs
@VICTORIAPENDRY1

Replying to @VictoriaPendry1
I will be writing to the Secretary of State for Education asking that all school pupils leave school with knowledge of climate change and that vocational education prioritises climate change in life-long learning activities
@TIMBALCONIEMA

Lots of great #ClimateChange education work happening but much more radical action is needed globally and quickly! @OASES_NorthEast @ClimateActionNE #learning #education #ClimateActionNow
@SHARONENV1

Intriguing article on #anxiety amongst #sustainability professionals – in the face of all the gloom and doom ahead. Dr Jan Maskell considers eco-anxiety and how we can build up our resilience to feelings of environmental doom
@IEMANET

Great to see our #rewilding #ClimateChange conference featured in this month's @iemanet @IEMA_Transform – thanks for your support! #sustainability #conference #climateactionnorth #environment
@SHARONENV1

Great article with @lizbonnin in @IEMA_Transform Really get the true sense of urgency we need to tackle environmental crisis
@SARAHJONESENV

DATES FOR YOUR DIARY

iema.net/events

17 OCTOBER

Solent Network Green Drinks

Come along to meet other members in the region and find out more about plans for events and activities that will influence environmental policy in your area. As regular fixtures in the calendar, these evenings provide a unique opportunity for members to network, share learning and discuss environmental issues.

To register: bit.ly/SolentNETWORK

24 OCTOBER

Successfully planning for infrastructure in Wales

With the emergence of new policies including the National Development Framework and the Planning Policy Wales – Edition 10, this event, organised by Waterfront, will provide updates on the impact these policies will have on infrastructure planning, as well as addressing how to overcome the biggest barriers facing the planning of new infrastructure in Wales.

Discounted tickets are available to IEMA members here: www.iema.net/affinity-partnerships

7 NOVEMBER

South East region networking social and CV review

This event provides a focal point for discussions on environmental policy, legislation and regulation, alongside networking opportunities and professional development for members in the region. This is a regular fixture in the calendar, providing an opportunity for members from within and outside the network to meet. A limited number of CV review sessions are also available.

To book, go to bit.ly/SE_IEMANetwork

27-28 NOVEMBER

IEMA Sustainability and Climate Change Theatre at EMEX

Taking place as part of EMEX at ExCeL London, the IEMA Sustainability and Climate Change Theatre gives you the chance to hear about effective energy, carbon and climate change techniques and opportunities for change from industry experts. The sessions are free to attend on either or both days of the event. By attending the IEMA Theatre at EMEX, you can also access the entire exhibition and enjoy the CPD-accredited seminar programme of approximately 80 sessions spread across five topical theatres.

To register, go to bit.ly/IEMAinEMEX

MEMBERS

IEMA member leads the world in wellbeing excellence

A newly published directory reveals that Georgia Elliott-Smith, BEng CEnv MIEMA of Element 4 is the world's leading Fitwel consultant on schemes outside the US, with more projects having achieved, or working towards, certification than any other practice worldwide. Fitwel is a building certification that aims to promote good health and wellbeing in building users.

The global Fitwel project directory, published in August by the Center for Active Design, showed that architecture firms Perkins & Will and Gensler lead the pack, but between them, they have only seven projects outside the US. Georgia is in third place globally, with eight projects, all in the UK. This makes Georgia the single most successful individual consultant working with clients to achieve Fitwel certification in the world.

Symphony Chau of the Center for Active Design said: "We incredibly value the feedback, meaningful collaboration, and strategic efforts that Ms Elliott-Smith and other consultants bring to strengthen the Fitwel Standard and its applicability within the global real estate industry."

Visit fitwel.org/project-directory to see the full list of registered and certified Fitwel projects. Georgia's profile can also be viewed at fitwel.org/ambassadors, where she is a featured ambassador

JUST PUBLISHED

Sustainable development goals: Harnessing business to achieve the SDGs through finance, technology and law reform

Edited by Julia Walker, Alma Pekmezovic and Gordon Walker

This book discusses how to invest existing financial resources and realign the financial system to reflect SDGs. It explores blockchain, big data, and fintech and regtech applications, while underscoring the relevance of sustainable, transparent supply chains. There is also a focus on accelerating progress through SME financing, crowd funding, peer-to-peer lending and tax restructuring.

Published by John Wiley, RRP £60

IEMA members: get connected

The Connect pages exist to showcase all the activities that IEMA members undertake in their passion for sustainability and the environment. We aim to highlight the discussions, events and achievements.

To report on any upcoming or recent events and activities, email: nicole.bains@redactive.co.uk

Chris Ferrary

FIEMA CEnv

Senior director, Temple Group

Why did you become an environment/sustainability professional? I left school with A Levels in economics and geography, and wanted to use these in a socially worthwhile career.

What was your first job in this field? Town planning technician trainee at the now-defunct Greater London Council in 1975. It was on an apprenticeship scheme that included day-release training, which I knew would be important to progress my career. University wasn't considered a serious option at my East End comprehensive in those days – only a handful of kids from my school went into any sort of further education, usually teacher training.

How did you get your first role? I applied via an advertisement in a schools career publication, and was successful at interview.

What does your current role involve? Directing EIAs for infrastructure projects, business management, winning work and staff development.

How has your role progressed over the past few years? Client organisations have often 'de-skilled' on technical matters. When I started in consultancy, your client typically knew more than you did, which is now much less frequently the case. This means the nature of the advice you have to give has changed. Also, there is much more wrangling with clients over contractual matters.

What's the best part of your work? Working collaboratively in teams, and the satisfaction that comes from finding a successful solution to a client's problem.

What's the hardest part of your job? Wrangling with clients over contractual matters!

What was the last development event you attended? An in-house refresher on managing contracts.

What did you bring back to your job? Take care over the details, and the big issues will be easier to deal with.

What are the most important skill(s) for your job? Good communication skills, empathy and patience.

Where do you see the profession going? Becoming mainstream in the public consciousness as issues such as the climate crisis and poor air quality continue to rise in importance. However, I'm not seeing much evidence of it yet. We need more professionals to stand up and be counted on this. It can't be right that the go-to media figure on the climate crisis is a 16-year old schoolgirl and not a sustainability professional.

Where would you like to be in five years' time? Happily retired, with the odd phone call asking me to dispense pearls of wisdom.

What advice would you give to someone entering the profession? This is still a young profession, and you can make it whatever you want it to be. Seek out your own challenges, and step up to the mark.

How do you use the IEMA Skills Map? It's helpful in advising younger colleagues on setting career goals for the medium and longer term, and identifying ways to achieve them.

If you had to describe yourself in three words, what would they be? Dependable, knowledgeable, curious (in all senses of the word!).

What motivates you? Understanding how cities work and how infrastructure shapes them, then using this knowledge to make them better. Although people are nostalgic for a rural idyll, cities are where most people live now, and getting them right is the way to benefit most people.

What would be your personal motto? Seek forgiveness, not permission.

Greatest risk you have ever taken? Leaving the public sector after more than a decade to join a consultancy. Actually, it was the best move I ever made.

If you could go back in history, who would you like to meet? Aneurin Bevan – a working-class lad responsible for the most important social change in British history.

"Cities are where most people live now, and getting them right is the way to benefit most people"

PHOTOGRAPHY: GETTY, ©KEYSTONE PRESS/ALAMY STOCK PHOTO

IEMA Transforming the world to sustainability

#IEMAawards19
@iemanet

IEMA Sustainability Impact Awards 2019

Inspiration | Innovation | Transformation

Congratulations to our winners of the IEMA Awards 2019

BEST TEAM
#BeyondPlastic Taskforce - Foreign and Commonwealth Office

WORKFORCE DEVELOPMENT
Hearts and Minds Engagement Campaign - Arriva Rail North

SUSTAINABILITY CAMPAIGN
10,000 Actions - The University of Manchester

CONSTRUCTION AND INFRASTRUCTURE PROJECT
Port Clarence and Greatham South Flood Alleviation Scheme - Environment Agency

NEW PRODUCT, SERVICE OR TECHNOLOGY
Wilson e2 Amorphous Transformer - Wilson Power Solutions

SUSTAINABLE ORGANISATION
Anglia Print

CONSULTANCY AND COLLABORATION
National Union of Students

INNOVATION IN IMPACT ASSESSMENT
iReport - Royal HaskoningDHV

CIRCULAR ECONOMY
James Cropper

BIODIVERSITY AND ENVIRONMENTAL NET GAIN
Wild West End - Arup

ENERGY AND CARBON TRANSITION
TAG Farnborough Airport

CLIMATE RESILIENCE AND ADAPTATION
Temaiku Land and Urban Development - Jacobs New Zealand

SUPPLY CHAIN MANAGEMENT
HS2

SUSTAINABLE FINANCE
WHEB Asset Management – WHEB

BEST CORPORATE STRATEGY
Kier Highways

COMMUNITY OR SOCIAL VALUE
SITA Air Transport Community Foundation - SITA

FUTURE SUSTAINABILITY LEADER
Sponsored by Year of Green Action 2019.
Samantha Carlsson, Senior Sustainability Consultant, Hoare Lea

SUSTAINABILITY LEADER
Dr Waddah Ghanem Al Hashmi, Senior Director - Sustainability, Business and Operational Excellence, Emirates National Oil Company (ENOC)

BEST VOLUNTEER CONTRIBUTION
David Hoare, Associate Director, WSP

View the photos, read up on the winners and register your interest for 2020 at:

» **www.iemaawards.net**

Sponsored by

RRC INTERNATIONAL

VolkerWessels UK

Year of Green Action 2019

If undelivered please return to:
IEMA, City Office Park,
Tritton Road, Lincoln, LN6 7AS.

The Delivery Group

Delivered by Royal Mail
C9 10017

IEMA Transforming the world to sustainability

EMEX The Energy Management Exhibition

IEMA Sustainability & Climate Change Theatre

EMEX 2019 - ExCel | London | Weds 27 & Thurs 28 November

Join us for your free two-day conference as part of EMEX 2019. This is a unique opportunity to hear about effective energy, zero carbon, climate change techniques and sustainability developments from industry experts including:

- Paul Pritchard, FIEMA
- Greg Chant Hall, FIEMA
- Dr Matthew Brander, University of Edinburgh
- Dan Hamza-Goodacre, Kigali Cooling Efficiency Program, FIEMA
- Nick Blyth, Climate Change & Corporate Sustainability Policy Lead, IEMA
- Martin Baxter, Chief Policy Advisor, IEMA
- Toby Robins, Operations Director, IEMA
- Professor Toby Peters, University of Birmingham and Senior Research Fellow, Heriot-Watt University

IEMA CPD
CONTINUING PROFESSIONAL DEVELOPMENT

Register today to secure your place:
emexlondon.com/iema-annual-conference