TRANSFORM

Environment
Economy
Society

FOR ENVIRONMENT AND SUSTAINABILITY PROFESSIONALS

April 2018
www.iema-transform.net

PREDATOR

Known unknowns: heeding the health risks lurking in our oceans

PLUS

Break with tradition Actuary Louise Pryor on sustainability in finance
Can wood ever be good? The effects of stoves on air quality
Quantity not quality Meeting the needs of energy demands

IEMA Transforming the world to sustainability


WEATHER
HAPPENS
When 81% of businesses suffered
unplanned power outages last year,
how can your business be better protected?
We should talk about making your business resilient
centricabusinesssolutions.com/resilience
Source: online survey of energy solution decision-makers and influencers in mid-sized organisations in the USA, UK, Ireland and Italy; conducted by Circle Research for Centrica.
centrica
Business Solutions

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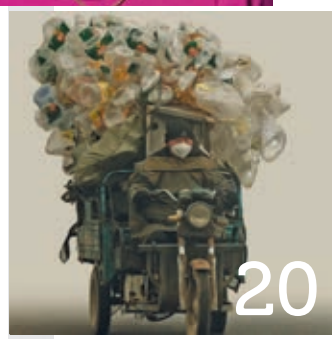

FEATURES

TIM BALCON, CEO OF IEMA

Help make our history

The word 'transform' is one that rings loud in our membership – not just in the name of this magazine. Everything you do is about change and improvement. Similarly, as your professional body, we have a responsibility to lead times of change and stay ahead of the game. Together, we've transformed IEMA over the past five years, and now that we have done all the right things to build and strengthen our foundations, it's time to go the extra mile. We're all set to transform a little more.

Over the years, many members have told me they need the environment and sustainability profession to be better positioned alongside other established professions. When we drilled down to find out what that would mean and look like in reality, it was all about accelerating global understanding, recognition and respect for IEMA and the profession. Exactly right – but what kind of profile drives that after all the exciting changes we're already made?

Those same members also specifically asked why IEMA wasn't a chartered body. That was a great question! A number of established professions become chartered to demonstrate that their practitioners' work hits three big targets – quality, impact and meaning. So, if there is any profession that should have chartered status, then it's ours. I hope you'll be pleased to know that we've been working on this for some time, and the time is now right for us to go for it officially.

On p7 you'll read about our intentions to apply for a Royal Charter this year, the steps we'll need to take for that to happen, and what all this means for you. You'll also read how your input is absolutely critical to progressing even one stage further, so I hope you will support our plans with a vote at our upcoming extraordinary general meeting (EGM) on 15 May.

On that date, you'll have the chance to help make our history as you vote in favour of formalising our application for a Royal Charter. We can progress no further until you have had your say.

This is a fantastic opportunity for you, the profession and IEMA. I look forward to seeing you at the EGM next month, where, together, we'll write a new history for environment and sustainability.

IEMA Transforming the world to sustainability

IEMA is the worldwide alliance of environment and sustainability professionals, working to make our businesses and organisations future-proof. Belonging gives us the knowledge, connections and authority to lead collective change, with IEMA's global sustainability standards as our benchmark. By mobilising our expertise, we will continue to challenge norms, drive new kinds of enterprise and make measurable progress towards our bold vision: transforming the world to sustainability.

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ROUNDUP

ENVIRONMENT & SUSTAINABILITY NEWS AND VIEWS

EXTREME WEATHER

Climate shocks fuelling poverty

Extreme weather events are costing farmers in the developing world billions of dollars each year, taking a heavy toll on food security and people's livelihoods.

A new UN report reveals that natural disasters hit the world's poorest countries with $96bn of agriculture losses between 2005 and 2015 – a sector on which 2.5 billion people depend.

Droughts are emerging as the most destructive threat, responsible for $29bn of the economic costs, although floods, forest fires, storms, plant pests, animal diseases and chemical spills are also causing widespread suffering.

"This has become the 'new normal', and the impact of climate change will further exacerbate these threats and challenges," said José Graziano da Silva, director-general of the UN's Food and Agriculture Organization.

Half of the damage caused by natural disasters in the decade following 2005 occurred in Asia, making it the most affected region in the world, with floods and storms having the largest impact.

Droughts were the costliest type of disaster in Africa, as well as Latin America and the Caribbean, causing crop and livestock losses of $10.7bn and $13bn respectively.

Crop pests and animal diseases were also among the most expense-inducing disasters for Africa, resulting in over $6bn in losses. Tsunamis, earthquakes, storms and floods were most costly for small island developing states.

The report highlights how small-scale farmers, herders, fishers and forest-dependent communities generate more than half of the world's agricultural production. However, because they are typically cash- and asset-poor, they are particularly at risk from disasters that destroy or damage harvests, equipment, supplies, livestock, seeds, crops and stored food.

Given the scale and intensity of threats to agriculture, the report argues that it is critical to develop disaster and crisis governance structures, including enabling policies, strengthened capacities and targeted financing mechanisms.

"Building a more holistic and ambitious disaster-resilience framework for agriculture is crucial to ensuring sustainable development – which is a cornerstone for peace and the basis for adaptation to climate change," da Silva added.

Download the UN report at bit.ly/2GttEbF

PHOTOGRAPHY: ISTOCK

SHORTCUTS

World's most powerful offshore wind turbine unveiled

GE Renewable Energy will develop the world's largest and most powerful offshore 12MW wind turbine over the next five years, generating enough power for up to 16,000 European households. The Haliade-X will produce 45% more energy than any other offshore turbine available today and feature blades longer than the size of a professional football field.

GE CEO Jérôme Pécresse said: "It took more than 20 years to install the first 17GW of offshore wind. Today, the renewables industry forecasts that it will install more than 90GW over the next 12 years." **bit.ly/2pg21vu**

Smart lampposts could save EU €2.1bn a year

New smart lampposts that use 50%-70% less energy than conventional street lighting could save the EU €2.1bn in bills and maintenance costs every year, according to research from Sharing Cities. The lampposts also feature air pollution monitoring capabilities and can guide cars to empty parking spaces, potentially reducing congestion and improving health and economic growth.

"We are on the precipice of a smart lamppost revolution," said Sharing Cities programme director Nathan Pierce. **bit.ly/2GApDCg**

Scientists urge stronger climate action

A coalition of 22 national science academies from around the Commonwealth have signed a statement urging governments to take further action mitigating climate change. This comes ahead of the Commonwealth Heads of Government Meeting on 19 April, with the coalition arguing that net-zero greenhouse gas emissions must be achieved in the latter half of the century to deliver the Paris Agreement. **bit.ly/2GApDCg**

PHOTOGRAPHY: SHUTTERSTOCK

RISK MANAGEMENT

Companies failing to address climate-related financial risks

Just one in 10 companies globally provide incentives for board members to manage climate-related risks and opportunities, reveals a new report from CDP, formerly the Carbon Disclosure Project.

This is despite 83% of companies recognising the physical threats of climate change, with 88% identifying policy changes and regulations as the biggest challenges posed by transitioning to a low-carbon economy.

The research analysed the risk management strategies of 1,681 firms worldwide, following the launch of the Task Force on Climate-related Financial Disclosures in December 2015.

"Overall, we see there is a surface level of preparedness from companies globally to have board-level oversight of climate risk and opportunity," said Jane Stevensen, CDP's task force engagement director. "What we are not seeing is increased governance translating into climate change mitigation. 2018 is the year when companies need to step up climate action as we approach a tipping point," she added.

Around 96% of UK companies have board oversight of climate change – the highest rating out of countries studied – while, at 97%, it also has the most firms disclosing scope 1 and 2 emissions. China has the lowest percentage in disclosing emissions, while the US has the fewest companies preparing to use carbon pricing and the lowest proportion with board oversight.

At 29%, Germany has the most firms incentivising board members to manage climate change, with France just behind on 25%.

CDP said that the challenge now is to embed this into corporate strategies "from board to the front line".

ENERGY

'Overwhelming' knowledge gap on renewable energy storage technology

Almost nine in 10 Brits are unaware of vehicle-to-grid chargers that enable stored renewable energy from electric cars to be sold back to providers at peak times for money.

That is according to research from OVO Energy, which also reveals that four out of five have never heard of home batteries that can store abundant cheap energy to be reused when energy is most expensive. This is despite savings and better control of energy consumption being prime drivers when considering sustainable products and services.

It also found that 51% would choose an electric car over petrol or diesel if they thought there would be savings in the long-term, while 57% would install a home battery if it could save money.

"People are clearly keen to start their green journey, but a lack of knowledge means many are unaware of the full benefits of harnessing renewable energy," said OVO Energy's director of electric vehicles, Tom Pakenham.

ROYAL CHARTER

Help make history: critical member vote on Chartership at May EGM

IEMA is set to embark on some exciting plans during 2018 – and members' input is absolutely critical in transforming the plans into reality.

Following five years of bold and smart moves under CEO Tim Balcon – including the Member Level Review, visual rebrand, new website, introduction of new training courses and guidance publications, and a brand-new magazine – the next step in building IEMA's profile and influence is becoming a chartered body via a Royal Charter, as first revealed in the March issue of TRANSFORM.

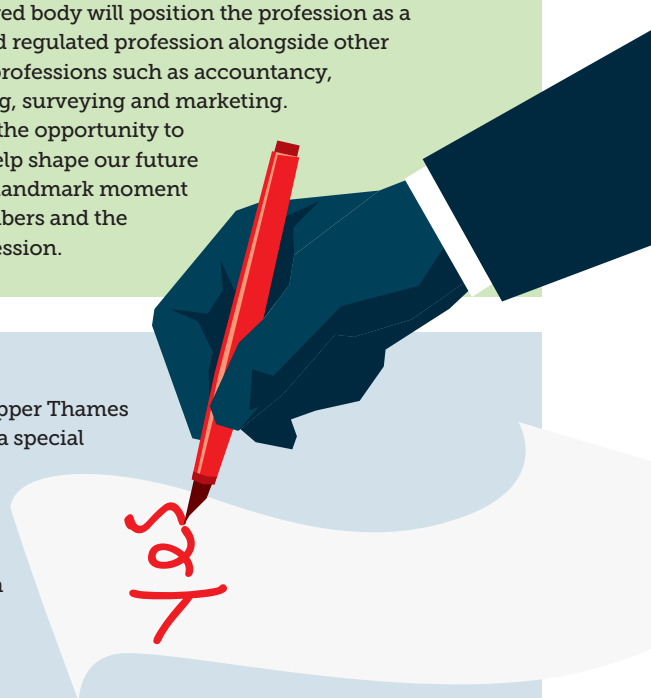
After completing all of the preliminary stages of application, it's now time to formalise our intentions, which means you can have your say on our vital next step – petitioning for a Royal Charter. As an IEMA member, you are invited to cast your important vote on passing a special resolution, which will permit IEMA to progress our Royal Charter application at an extraordinary general meeting (EGM). See the full EGM notice on p35.

The EGM will be held at an impressive and historic location in Central London – Vintners' Hall – at 6pm on 15 May 2018. The member vote is an important gateway point in the application process, so IEMA encourages as many members as possible to vote for us to petition for a Royal Charter so we can successfully progress to the next stage with the full permission and support of our membership.

Rights and responsibilities

A Royal Charter is signed and issued by the Queen, and grants certain ownerships, rights and powers to an individual or organisation. For professional bodies like IEMA, those cover an organisation's areas of responsibility, including promoting and regulating its profession. It means that – subject to the successful member vote – IEMA will be formally recognised as the professional body for corporate sustainability, environmental management and impact assessment.

For members, this move is an important one, as it will mean increased profile and career recognition; membership of a chartered body will position the profession as a defined and regulated profession alongside other chartered professions such as accountancy, engineering, surveying and marketing. Therefore, the opportunity to vote and help shape our future profile is a landmark moment for all members and the wider profession.



How to vote

The official member vote will be held as part of an EGM at Vintners' Hall, 68 Upper Thames Street, London, EC4V 3BG, at 6pm on 15 May 2018. The vote – officially called a special resolution – will be the only agenda item for the meeting, and voting is very straightforward. If you wish to vote but can't attend in person, you can appoint a proxy to vote in your place – either someone you know or the company secretary.

The EGM will be followed by an evening event featuring presentations from M&S head of Plan A and IEMA Fellow Mike Barry as well as the former chief executive of the Environment Agency, Paul Leinster, among others. As well as the opportunity to hear from these inspiring leaders firsthand, you'll enjoy refreshments and networking opportunities.

FOR FURTHER INFORMATION

Full details about our ambitions to achieve a Royal Charter, the EGM and vote, the evening event and FAQs are available at iema.net. If you have any questions about IEMA's plans, get in touch with Katrina Pierce any time at k.pierce@iema.net

MEMBERSHIP

Get free feedback on your CPD

IEMA is about to start the spring round of continuing professional development (CPD) sampling; this is where we select a proportion of members and ask to see evidence of their 2017/18 CPD to ensure that their learning is on track, and that they're helping to uphold our high standards.

Maintaining an up-to-date CPD record is a mandatory requirement of all professional membership grades and specialist registrants. Once every quarter, we contact 2% of eligible members to request evidence of their CPD, so we can ensure they, as a representative sample of the membership, continue to meet the profession standard relevant to them.

Members selected to submit their CPD evidence will have one month from the date of contact to return their record. We accept a variety of formats – you don't have to use the IEMA CPD forms, although they do provide an excellent structure for what you should record and reflect upon. But if you already record your learning and development in another format then there's no need to submit anything different.

If you are selected, this is a chance to get free, quality feedback on your CPD and how your activities support your development goals from a qualified assessor. You'll receive feedback within four weeks of submission.

Go to www.iema.net/cpd/ to find out more about recording and submitting your CPD

SPRING STATEMENT RESPONSE

£20m fund for plastics R&D 'won't stretch far'

On Tuesday 13 March, the UK chancellor of the exchequer Philip Hammond delivered the first spring statement to reveal any amends to the Treasury's planned annual spend.

Coverage of environment and sustainability issues was scant, and IEMA's chief policy advisor Martin Baxter said: "The fact that air quality and tackling single-use plastics are the environmental headlines is arguably reassuring, given they are high on the public, news and political agendas."

He continued: "We're pleased to see investments in critical areas. However, the £20m R&D fund promised to businesses and universities to reduce the impact of single-use plastics will not stretch far. Future levies that catalyse consumer behaviour change will likely have a more significant impact."

Go to bit.ly/2DwrC7Q for the full statement

REGULATION

Remain within REACH, says Environmental Policy Forum

As the House of Lords debated the future of chemical regulation post-Brexit, the Environmental Policy Forum (EPF), which includes IEMA, expressed concerns and issued strong recommendations.

The EPF wrote to peers on 7 March to recommend that the UK remains in the EU chemical framework REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) rather than creating a parallel and potentially expensive and inefficient UK system.

Following the prime minister's speech on 2 March, recognising the need for the UK to remain part of the European Chemicals Agency, the EPF is calling on peers to secure binding commitment from the government on this as they discuss chemicals and chemical regulation.

Read the full letter and background information at bit.ly/2FIIPAA

NEW REGULATIONS

THE LATEST
■ GUIDANCE ■ CONSULTATIONS ■ LEGISLATION

30 JANUARY 2018

Pollution prevention

The Environmental Permitting (England and Wales) (Amendment) Regulations 2018 are now in force and introduce permitting requirements for medium combustion plants (MCPs) and specified generators.

cedr.ec/4x7

22 FEBRUARY 2018

Greenhouse gas emissions

The Fluorinated Greenhouse Gases (Amendment) Regulations 2018 aim to enhance the enforcement of the EU regulations that were introduced to support Regulation (EU) 517/2014 on fluorinated greenhouse gases. Civil penalties for infringements of the EU regulation will be introduced from April 2018.

cedr.ec/4x9

1 MARCH 2018

WEEE

The Waste Electrical and Electronic Equipment (Amendment) Regulations 2018 aim to clarify the rights of local authorities in relation to designated collection facilities and insert a new reporting requirement for WEEE sent for treatment or reuse outside the UK.

cedr.ec/4xa

1 APRIL 2018

Landfill

The Landfill Disposals Tax (Wales) Act 2017 (Commencement No. 2) Order 2018 brings the Landfill Disposals Tax (Wales) Act 2017 fully into force on 1 April 2018. In addition, the Landfill Disposals Tax (Tax Rates) (Wales) Regulations 2018 set the standard and lower rates for the tax.

cedr.ec/4xf
cedr.ec/4xg

1 JULY 2018

Air pollution

The National Emission Ceilings Regulations 2018 set out national emission ceilings to be achieved and implement Directive 2016/2284/EU relating to national emission ceilings for certain atmospheric pollutants. They come into force in July 2018.

cedr.ec/4x8

9 FEBRUARY 2018

Waste

The Environment Agency has issued a position statement regarding waste carrier, broker and dealer registration renewals due after 25 March 2018.

cedr.ec/4x5

27 FEBRUARY 2018

Environment and agriculture

The Department for Environment, Food & Rural Affairs seeks views on the proposals for the future of the environment and agriculture after the UK leaves the European Union. It sets out some general and specific ideas for environmental and agriculture policy post-Brexit.

cedr.ec/4xi

12 FEBRUARY 2018

Climate change

The Department for Environment, Food & Rural Affairs has published a consultation on the proposed strategy for the third round of the Adaptation Reporting Power. Under the Climate Change Act 2008, the government can ask certain organisations to produce reports on the effects of climate change.

cedr.ec/4xj

INCOURT

Poorly made connection: 11,000 litres of diesel entered the groundwater

POLLUTION

Contractors fined £180,000 over diesel spill

Two contractors saw a combined fine of £180,000 levied against them after a diesel spill.

The contractors – Kier Construction and its subcontractor, BKP Waste And Recycling Ltd – were sentenced to the fine after admitting guilt over a pollution incident that saw 11,000 litres of diesel enter the groundwater.

Kier took the brunt of the fine, with £100,000 and an additional £30,300 in costs, and BKP Waste Recycling Ltd was fined £10,200 and paid £42,500 in costs.

In 2012, Kier Construction secured work from the Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust to carry out redevelopment work at Christchurch Hospital. The construction giant, which had a record £3bn worth of contracts in 2017, then subcontracted BKP Waste And Recycling to drain and remove oil from the supply lines within the hospital grounds. Two years later, the oil drainage line leaked, in what was labelled a "poorly-made connection in the oil supply pipework".

Both companies were prosecuted under the Environmental Permitting (England and Wales) Regulations 2010, as the incident took place when those regulations were still in force.

CASE LAW

Appeal dismissed for wind farm

The secretary of state refused an application for a development consent order for the construction of a wind farm near a special protection area that supported breeding pairs of red kites.

She considered the importance of renewable energy from the wind farm against the protection of species under, at the time, the Conservation of Habitats and Species Regulations 2010.

After deliberation on the lack of information provided by the developer, the appeal was dismissed. The developer appealed that decision, in the case of R (ota Mynnyd Y Gwynt Ltd) v Secretary of State for Business Energy and Industrial Strategy, arguing that the Secretary of State had erred in requiring certainty in relation to the information requested, instead of making a reasoned judgment on the available information. It also stated that she had reached an inconsistent conclusion about the level of risk to the red kite population compared with other wind farm proposals in the area.

Lord Justice Lewison stated that the secretary of state was not asking for absolute certainty about the red kite population but did require clarity, a view that she was entitled to take.

He also said other wind farms in the area that had been granted development consent orders were so different from this case that they could not be compared. This included the fact that two of those wind farms had no "connectivity" to the special protection area.

The appeal was dismissed.

OTHER NEWS

Waste company fined £16,000 for fly infestation and permit breach

A waste company based in the North East of England was handed a fine of £16,000 and ordered to pay costs of £10,000 after breaching its environmental permit. This led to a fly infestation at the site in Monument Park, Washington.

Niramax Group Limited also failed to comply with an enforcement notice at its site at Tofts Farm, Hartlepool, where a large amount of waste tyres had created a potential fire hazard.

The Washington infestation appeared to come about as a result of the bay doors not operating properly, affecting pest control measures. Neighbours were approached by the Environment Agency, and confirmed the negative impact of the infestation.

A further notice was served in regards to the tyres, when the agency received complaints about dust. In addition to the fly infestation and tyres, further breaches were found relating to dust, and a dust management plan was issued to resolve the breach.

The Environment Agency made a statement that they "hope this case reassures our communities that we will do everything possible to ensure operators comply with their permit, and take enforcement action when they don't."

NATURAL WORLD

'An unprecedented act of preservation'

Chile has established five new national parks and expanded three others, protecting vast swathes of Patagonia's rainforests, grasslands and other wild terrains.

The move was made possible after US philanthropist Kristine McDivitt Tompkins donated over one million acres of private land to Chile, signing a decree with the country's then president Michelle Bachelet in March 2017.

This is the largest donation of private land to a government ever seen, creating a network of national parks spanning 10.3 million acres in what has been described as an unprecedented act of preservation.

National parks in Chile will increase by 38.5% as a result of this initiative, and account for 81.1% of the country's protected areas, with Bachelet urging other nations to follow Chile's example.

"Chile is still a developing country, with a large history of development and resource exploitation — in most cases, overexploitation," she said. "If Chile can take this gigantic environmental measure, there are few reasons why developed nations cannot act as well."

PHOTOGRAPHY: TOMPKINS CONSERVATION

Breaking with TRADITION

Louise Pryor tells Chris Seekings how actuaries are advising the financial world to make sustainable decisions, facilitating a global shift towards a low-carbon economy

When considering the professions at the forefront of tackling climate change, few would envisage actuaries playing an important role. Traditionally concerned with the maths and probability behind insurance premiums and life expectancies, the role of an actuary is rapidly transforming into one where climate change is increasingly central.

While not obvious at first, the issue is at the heart of forecasting risk, encompassing everything from investment returns to human health, with actuaries occupying a unique role in advising the financial world on how to respond.

I meet up with Louise Pryor, an actuary and consultant who specialises in climate change, to learn more about how the profession is evolving, and why the decisions actuaries make today could be vital in ensuring a more sustainable future.

A trying transition

I begin by asking what has caused this shift in environmental awareness among her colleagues? "Climate change has huge financial risks associated with it – we think it's going to change the economy and how the world operates." She explains how actuaries use sophisticated models to try to predict the outcomes of various different scenarios. "We are very interested in understanding the worst-case scenario so that we can handle that should it arise." This could be to determine what premiums to charge people for health or general insurance, whether to provide coverage for certain infrastructure projects, and perhaps more importantly, how various scenarios could affect investments. Pryor points out how, particularly for life insurance, insurers rely heavily on the returns they make on their investments to continue operating.

A report from The Carbon Tracker Initiative warns that investors and markets are at risk of losing £1.6trn as a result of fossil fuel projects becoming redundant amid a global shift away from highly polluting energy sources. This is being driven by various initiatives, from international climate change commitments, to a boom in clean technologies.

"So if it suddenly emerges that you can't burn those fossil fuels, and there are limits on what carbon you can produce, they are all going to lose their value – you are going to get huge changes in essentially what's worth money and what's not worth money," Pryor explains.

This is one of the areas where actuaries, asset managers and pension fund trustees will have a key role in the fight against climate change, shifting the funds of some of the biggest financial organisations in the world away from carbon-intensive firms to green and sustainable ones.

However, this transition is not an easy undertaking, as Pryor reveals many have tried to push back against the way the actuarial profession is changing. "I think that it is only natural when people do their jobs very well and don't want them to change," she says.

"My point of view though is that these long-term risks can't be ignored, and we are going to have to direct investments in areas that are likely to be more sustainable over the long-term. Ignoring it is simply not an option, and simply cannot happen."

The three risks

Pryor tells me how actuaries have identified three categories of risks that they need to be aware of in their new roles, the first being the physical risks of climate change. This concerns the effect that factors such as extreme weather and rising sea levels could have on investments around the world. "Would you invest in property on the coast of Florida right now?" she asks.

"If things change a lot, you might have various health implications from climate change too. How is that going to affect labour resources for your widget factory in Bangladesh, for example?" These health risks also pose a challenge to the way that premiums are calculated for life insurance, with Pryor explaining how the sheer scale of the knock-on effects of climate change makes it increasingly complex to forecast the various outcomes.

Transition risk is the second risk she identifies, and concerns the threats and opportunities of moving towards a low-carbon economy. Pryor highlights how the economic system is driven by energy, and how this transition away from the old way of doing things poses a material risk to businesses of all kinds.

"Whole industries are going to have to change the way they work, which is making a huge difference to the renewable energy industry, for example." The latest figures from Bloomberg reveal that investments in renewable energy and green technologies increased by 3% last year to £240bn, just short of the record set in 2015. "People used to think that this environmental shift was just ethical, and a bit warm and fuzzy, but it is a business opportunity," she says.

The third risk she outlines might not be of concern to most but is increasingly alarming to actuaries, and that is liability risk. Pryor explains how more and more firms are becoming the subject of lawsuits for the damage they have contributed to climate change, particularly oil and gas companies.

> "People used to think that this environmental shift was just ethical, and a bit warm and fuzzy, but it is a business opportunity"

"There is a worry that investment advisers could also be held liable because they have invested in areas that do environmental damage." She tells me how this could even spread to architects and engineers that don't consider their impact on climate change, warning that law companies will "go after anyone". "That doesn't mean we all have to be sustainability experts, but if you are not, go and talk to someone else that is, rather than just ignoring it."

Cashing out of coal

One of the biggest criticisms levelled at the insurance industry by environmentalists is how it continues to underwrite coal projects that would be unable to operate without their insurance coverage. A report from the Unfriend Coal campaign reveals that insurers have signed at least 21 contracts underwriting coal in Poland alone since 2013, including the biggest plant currently under construction in Europe.

However, there is evidence that this is changing, with some of the world's top insurers, including Zurich and AXA, having taken steps to stop covering these projects. "These big corporates don't like bad press coverage," Pryor says. "And I think it is gathering momentum – not as fast as some of us might like, but we are getting more and more firms saying something has to be done."

There is also positive news on the investment side, with 15 of the world's largest insurers, managing approximately £22.4trn of assets, divesting £14.4bn from coal projects in the past two years, with Italy's largest insurance company Generali recently announcing a £1.8bn divestment. However, there is still a long way to go, with Pryor explaining how she thinks it will ultimately

be pressure from policyholders and pension scheme members that accelerates action. "Essentially it is their money that is being invested, and if they start having strong feelings, companies will need to think more about their broader impact on society."

She highlights how a growing number of investor activist groups are also putting an increasing amount of pressure on fossil fuel companies. "If they turn their attention to other sectors, I think the financial sector would be in their sights, and I could see that also having a big effect."

A reflection of the growing concern many have with the way their money is invested can be seen with the launching of the Task Force on Climate-related Financial Disclosures. This was established to encourage firms to accurately report the risks climate change poses to their businesses, so investors have a better understanding of their financial health.

"Transparency is good. The more information you've got, the better able you are to make good choices," Pryor says. "And this is part of a virtuous cycle – if investors direct their funds to areas they think will be more sustainable over the long-term, that will then encourage the companies themselves to be more sustainable."

> You shouldn't see it as ethical. If these big companies ignore these issues, they're going to suffer financially – so this is financial, and is quickly moving into the mainstream."

Forecasting the future

The new role that actuaries occupy is still in its infancy, and, despite some resistance, Pryor argues that sustainability will increasingly inform their decision-making in the future. She tells me how the profession is taking an interest in the UN's sustainable development goals (SDGs), particularly the G7 target to provide 400 million people in developing countries with insurance products that protect against climate risk.

"There is a lot of thought going into how we can help people in the informal sector – people that are not formally employed – and how we can provide good saving opportunities for those people to give them a financial cushion," she says.

I am keen to know what is driving this engagement though, and ask whether this is just a box-ticking exercise? "There are certainly some that do it because they just think it looks good for their reputations, but there are those that genuinely feel that the wellbeing of the world is good for them – it's hard to generalise because these big corporates are all so different."

My conversation with Pryor has highlighted the multiple ways that financial institutions are helping to mitigate and build resilience to climate change through sustainable decisions. Various reports have demonstrated how this extends beyond the SDGs, with many warning investors to move their asset allocations away from companies that do not acknowledge the surge in demand for plant-based food, the threats of antibiotic resistance in livestock, their impact on water security around the world, and a boom in demand for ethical investments. I ask Pryor if there is any limit to the scope of ethical considerations in decision-making. "You shouldn't see it as ethical," she says. "If these big companies ignore these issues, they are going to suffer financially – so this is financial, and is quickly moving into the mainstream."

It is a blunt reminder that most firms see this as a business opportunity first and foremost, which Pryor says is not necessarily a problem, so long as action is being taken to tackle these global issues. However, she is keen to point out that these giant financial firms need to own up to their responsibility.

"There has got to be a change in attitude and the financial world needs to take this seriously. We can't keep saying 'yes isn't it awful but there is nothing we can do' – that is not true, there is great deal we can do."

Avoid appearing *'plastic'* on sustainability

Awareness of the issues associated with plastic waste are at an all-time high. Those improving sustainability and environmental performance will never have a better opportunity to present their case

For many in the UK, it was David Attenborough and the producers of the *Blue Planet* series who brought the issue of plastic waste into our lounges and firmly onto the mainstream media's agenda. This, alongside the high level of campaigner activity on social media and traditional media, has resulted in public demands that we stem the tide of plastic waste.

The government and global brands are now trying to show they're taking action. Adidas, for example, has a stated commitment to eliminate virgin plastic from its shoes and, through its work with Parley, has a goal of producing one million pairs of UltraBoost trainers, using ocean plastic, this year.

The UK government announced commitments to eliminate all avoidable plastic waste by 2042. Under the pledge, waste such as carrier bags, food packaging and disposable plastic straws would be abolished. The move follows a broader previous 25-year plan, which will also encourage supermarkets to set up "plastic-free aisles" for goods with no packaging, and confirmed plans to extend the 5p charge for carrier bags to all English retailers.

This momentum has provided a great opportunity for some brands to gain some quick PR wins from positioning themselves at the forefront of change. Iceland, for example, was quick to announce a new range of products free from plastic packaging. But this wave of media attention also brings the opportunity for businesses to make deeper-rooted changes, which will aid them in developing more environmentally and commercially sustainable business models for the future.

For those people who are tasked with responsibility for sustainability and environmental performance, there will never be a better opportunity to present their case to a more sympathetic audience. Waste has arguably never been so high up the corporate agenda, and there is a broad recognition that businesses need to take action to firstly protect the brand and then to potentially enhance it. It's amazing what a little 'fear' of alienating the customer can do. More proactive and forward-looking businesses will see this as an opportunity to realise some genuine commercial, social and environmental value.

At this point, however, there needs to be a note of caution. In the same way that we should be wary about letting the media dictate our environmental priorities, we must ensure that whatever action we take in this situation is strategic and designed to bring about credible and sustainable change. It is easy to be led into a 'knee-jerk' reaction, which, while servicing the need to be seen to be doing something, acts as little more than a sticking plaster.

Helistrat is passionate about working with our customers to re-engineer supply chains and 'design out' waste – including plastics. This enables our customers to become more resource efficient not only in their own processes but also to engage a supply chain that is aligned to their ambition. Wherever possible, we look to develop more circular models that feed valuable secondary resources directly back in to these suppliers as their raw materials of the future.

We have recently released a report on our *Point of View on Plastics,* which explores socio-cultural factors surrounding the material, the effects of regulation change and the recommendations for next steps to help mitigate risk and safeguard businesses in the future. Visit our website news pages to download a copy.

For more information, see www.helistrat.co.uk

Helistrat

Off the back burner

Rick Gould looks at the effects of wood-burning stoves on air quality

Last September, London's Mayor, Sadiq Khan, called for strong restrictions on wood-fuelled stoves, following reports that burning wood makes a big contribution to particulate air pollution. His proposals included a ban on solid fuels in low emissions zones. A report published in 2017 jointly by King's College London (KCL) and the National Physical Laboratory (NPL) and released in early 2018 confirmed the link between wood-burning and poor air quality.

But this research also showed how complex the situation is; for example, the team found a downward trend in emissions, while the levels of particulate emitted strongly depends on the type of wood-burning appliance.

The rise of the stove

According to the Stove Industry Alliance (SIA), the sector's trade body, UK suppliers sell about 175,000 stoves annually, with around a million stoves sold over the past decade and a greater proportion in London. This growth has been catalysed by schemes such as the Renewable Heat Incentive, the Merton Rule, and the perception that wood is a cleaner, greener, low-carbon source of energy.

Indeed, the SIA adds that "modern wood-burning stoves are virtually carbon neutral when using current burn technology".

However, wood-burning can also emit considerable amounts of respirable particulate matter, PM10, as well as its more harmful, smaller component, PM2.5. Owing to the rising popularity of wood-burning, UK researchers and their overseas counterparts have examined how this affects air quality.

Aethalometers and levoglucosan

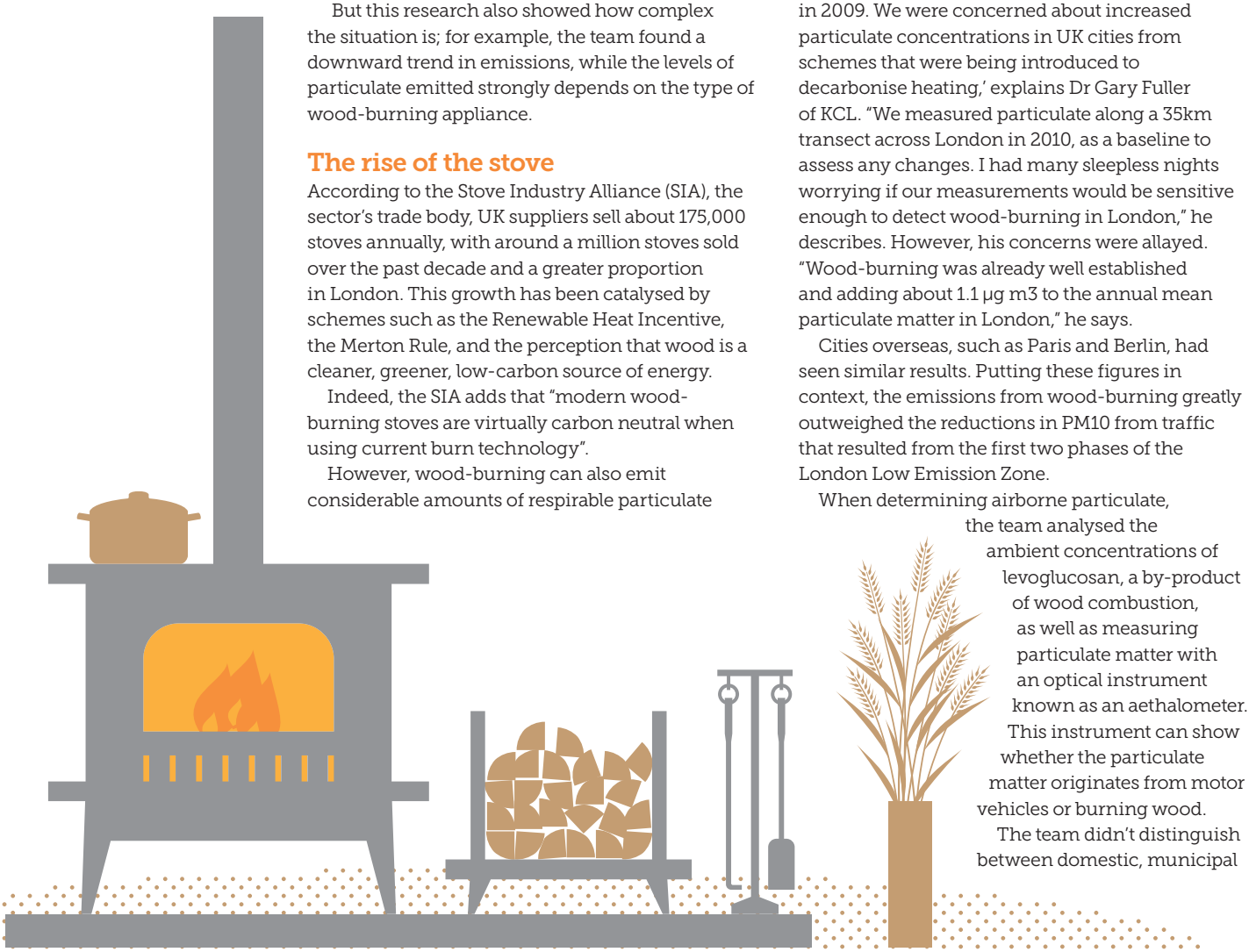
In 2014, a team from KCL, NPL and the Norwegian Institute for Air Research published the results of a three-year investigation of wood smoke in London.

"Our wood-burning investigations began in 2009. We were concerned about increased particulate concentrations in UK cities from schemes that were being introduced to decarbonise heating,' explains Dr Gary Fuller of KCL. "We measured particulate along a 35km transect across London in 2010, as a baseline to assess any changes. I had many sleepless nights worrying if our measurements would be sensitive enough to detect wood-burning in London," he describes. However, his concerns were allayed. "Wood-burning was already well established and adding about 1.1 µg m3 to the annual mean particulate matter in London," he says.

Cities overseas, such as Paris and Berlin, had seen similar results. Putting these figures in context, the emissions from wood-burning greatly outweighed the reductions in PM10 from traffic that resulted from the first two phases of the London Low Emission Zone.

When determining airborne particulate, the team analysed the ambient concentrations of levoglucosan, a by-product of wood combustion, as well as measuring particulate matter with an optical instrument known as an aethalometer. This instrument can show whether the particulate matter originates from motor vehicles or burning wood.

The team didn't distinguish between domestic, municipal



and commercial wood-burning, but the data itself was informative. 'In 2010, the diurnal and seven-day variations pointed strongly to domestic sources and not offices or schools, for example,' explains Fuller.

Based on these findings, KCL and NPL continued this research, adding data from Birmingham and extending the investigation into 2016. They then determined that wood burning could contribute between 23% and 31% of airborne PM2.5.

When considering the headline data at face value, it would be simplistic to conclude that wood-burning stoves are solely responsible. But the team emphasises that the emissions from wood-burning vary widely depending on the appliance used, while The Department for Environment, Food and Rural Affairs (Defra) and the SIA point out that the type of wood and its moisture content also influence the emissions. So how do these factors affect air quality?

From open fires to eco-stoves

In the report released this year, the authors point out that there is a wide spectrum in emissions from open fires to modern, wood-burning stoves and boilers that have higher combustion efficiencies.

For example, the team cites emission tests performed in Portugal; this research found that particulate emissions from fireplaces were three times greater than those from a traditional stove, 12 times greater than those from a modern, eco-labelled stove, and fifteen times greater than a similar stove fuelled with wood pellets.

Moreover, the SIA points to estimates that in domestic properties in London, up to 70% of wood is burned in open fires. Additionally, a survey of national, domestic wood-use carried out in 2015 by the Department for Business, Energy & Industrial Strategy revealed that the proportion is 40% nationally. This suggests that burning wood in open fires is the biggest source of poor air quality. Notably, the Clean Air Act prohibits wood-burning in open fires in much of London.

Most stoves in the UK are traditional ones that can be used in smokeless zones where they have an exemption. Such appliances have to be tested and meet specified limit values for emissions of particulate matter. From 2022, all new stoves in the UK must meet the EC's eco-design criteria, such as much tighter emission limits for particulate matter.

In simple terms, modern stoves typically pollute less. For example, a report in the 2012 *Journal of Occupational and Environmental Medicine* described a programme in the US town of Libby, Montana, where 1,100 older stoves were replaced with modern, cleaner, more efficient types between 2005 and 2007. Following this, PM2.5 concentrations dropped by about 28%, whilst the incidence of respiratory illnesses also fell.

Similarly, when considering the downward trend in emissions from wood-burning, KCL and NPL suggest that "one possible explanation is the replacement of high-emission fireplaces with newer, lower-emission wood-stoves, balancing an increase in total wood heating".

Let's not forget the seasoning...

Numerous studies have also found that the type of wood fuel significantly affects emissions. Kiln-dried or seasoned wood, for example, burns much more efficiently than freshly cut wood, with the latter having emissions that can be several times higher. Waste wood has even higher emissions and can result in releases of heavy metals.

Prompted by the research results, Defra has produced guidance on wood-burning, providing users with advice to keep emissions low. The SIA is also promoting eco-design-ready stoves before the 2022 deadline, as there are several brands already approved. Both the SIA and Defra recommend using certified Ready to Burn wood with a moisture content below 20%.

In February, Defra consulted on wood-burning and will use the responses to determine its options for reducing pollution. It has emphasised that it does not intend to ban wood-burning, but will act to reduce emissions and improve air quality. This is likely to involve stronger measures to enforce the Clean Air Act and stop wood-burning in open fires and a faster transition to eco-compliant stoves.

Ultimately, however, perhaps we should consider just using less wood fuel or none at all if air quality is at risk. "I think we should really question if home wood-burning has a place in the city of the 21st century," concludes Fuller.

RICK GOULD MIEMA is writing in a personal capacity as a freelance journalist

FAST FACTS

175,00

stoves are sold annually in the UK

Wood-burning can contribute between **23%** and **31%** of airborne PM2.5

2022

From 2022, all new stoves supplied in the UK must meet the EC's eco-design criteria.

When wood is good

The Stove Industry Alliance (SIA) estimates that wood-burning stoves could account for 10% of the UK government's carbon reduction targets by 2020; with the potential to produce 25% of the domestic renewable heat energy target by 2020.

High-quality wood emits less CO_2 when burned than it does with natural decay, so correctly installed stoves producing emissions of only 0.008kg CO_2 per kWh – compared with emissions of 0.198kg from gas and 0.517kg from electricity – provide an attractive alternative to gas and electricity for heating.

Waste to wealth

Could China's ban on the import of certain types of plastic waste present an opportunity for other nations to profit? ***Dr Uche Okere*** reports

For years, China and Hong Kong have provided an outlet for waste plastic from countries around the world. In 2016 alone, developed countries including the UK, the US and Japan reportedly shipped 7.3m metric tonnes of waste plastics, valued at $7.3 billion, representing 56% of the world's recycled plastics to China.

In July 2017, China announced significant changes to the quality control measures it applies to imported materials, resulting in a ban on 24 categories of recyclables and solid waste by the end of the year. Unsurprisingly, considering the dominant role of China in the market, this ban has created concerns about the fate of the world's waste plastic.

As of January 2018, the impact of the ban was already being felt, with reports of increasing plastic stockpiles that may end up in local landfill sites or for incineration. In the UK, the chief executive of the Recycling Association told the BBC that the ban is a huge blow for the industry and that the UK simply does not have the market to deal with its waste plastic.

While the negative impacts of this ban are easy to identify, could other nations benefit and develop their own manufacturing sector by becoming the new choice destination for plastic waste?

China became a global force in manufacturing by, among other factors, taking advantage of globalisation. It grasped opportunities created by the West's predominant decision in the 1980s, under Reagan and Thatcher, to position their economies as service providers rather than manufacturing economies. For China, importing cheap waste plastics from around the world as raw material for its manufacturing industry provided a solid base for the industry to grow.

Surely, there are nations around the world who could also grow their manufacturing industries as a way of boosting their economy, by using the waste no longer exported to China.

Current indications are that South-East Asian countries like Malaysia, Vietnam, Indonesia and Thailand will take on most of the plastic waste, owing mainly to their proximity to China and the availability of cheap labour. African nations like Nigeria and South Africa could also muscle their way into this market.

The ideal and best outcome from China's decision will be a global reduction in the generation of plastic waste, as pressure increases on manufacturers to take responsibility for their waste products throughout their life cycles. The reality remains that humanity is still years away from being weaned off its plastic habit, and the amount still currently in circulation must be dealt with one way or another.

Lessons to be learnt

Whether the current global economic conditions can facilitate the rise of a nation's manufacturing industry as it did for China in the 1980s will be a significant consideration for any nation that may wish to view China's ban as an opportunity to take in some of the world's waste plastic. They must also deal with the question of what to do with the imported waste in light of the growing awareness of the environmental impacts of plastic.

Lessons must be learnt from the huge health and environmental costs paid by China in developing its manufacturing industry. Such nations must also be willing to develop relevant infrastructure such as power as well as the labour laws needed for economic growth.

The UN sustainable development goals provide a holistic picture of what sustainable development should mean.

In nations where dealing with the human impacts of poverty and economic inequality are a priority, environmental protection objectives may never be achieved. However, if a nation can, like China, work its way out of poverty, then maybe, like China, they too can eventually enact laws and take steps to improve their environmental behaviour.

DR UCHE OKERE is the academic lead for environmental management at the University of Derby Online Learning

A plastic PESTILENCE?

While ingesting microplastics is not yet a proven health risk, isn't it better to be sure? ***David Burrows*** reports

Two years ago, the Ellen MacArthur Foundation published a report on global use – and misuse – of plastic. It covered 117 pages, but this bit grabbed the headlines: "The best research currently available estimates that there are over 150 million tonnes of plastics in the ocean today. In a business-as-usual scenario, the ocean is expected to contain one tonne of plastic for every three tonnes of fish by 2025, and, by 2050, more plastics than fish (by weight)."

Think about that for a minute (and while you do so another rubbish truck's worth of plastic will 'leak' into the ocean). In fact, of the 78 million tonnes of plastic packaging produced every year, almost a third (32%) ends up in the environment (and that's only one source of plastic pollution – there are also pre-production plastic pellets, microbeads in cosmetics, textiles and car tyres). Once there, it can be gobbled up by a variety of marine life – in big chunks (as the BBC's *Blue Planet II* series showed) or in much smaller quantities as it breaks down into 'microplastics' or as even smaller nanoparticles.

It's not good news for wildlife. In a recent review of the literature to date, the United Nations Food and Agriculture Organization (FAO) found that over 220 different marine species ingest microplastic debris 'in natura'. That's concerning, but here's the kicker: take out the birds, turtles and mammals and 55% are species of commercial importance – Norway lobster, oysters, sardines and Atlantic cod.

"Human intake of microplastics from seafood (ie mussels) has been estimated to equal anything from one particle per day to 30 particles per day depending on seafood consumption habits and exposure of organisms to microplastics," the authors noted.

And it's not just your mackerel on toast that is bringing an unwanted helping of plastic pieces – contamination has also been found in honey, sea salt and beer. Indeed, wherever scientists look they seem to find plastics – including tap water. The results of a study published by Orb Media in September showed that microplastics were present in 72% of the samples taken in European countries – an average 500ml glass of water for example contains 1.9 plastic fibres.

So is this plastic plague just an environmental crisis, or is it a human health concern too? And, if so, will it trigger politicians and businesses to introduce swift, deep, global policies to curb plastic use and pollution?

The short answer is: we don't know. Looking on the bright side, the levels of contamination are low. In the case of seafood, for example, the gut is where most microplastics end up, and that's often removed before consumption. When it's not, a 'worst case' estimate of exposure to microplastics when eating a portion of mussels would be 7µg of plastics. It's not enough to cause concern. The European Food Safety Authority (EFSA) came to the same conclusion: in its May 2016 analysis, experts concluded it "seems unlikely" that microplastics could be harmful to consumers.

Lack of data

But there is a longer, more complicated answer that considers all the ifs, buts and maybes created by what regulators and researchers admit is a lack of data – especially on the very smallest particles. "We know that engineered nanoparticles (from different types of nanomaterials) can enter human cells, so this may have consequences for human health. But more research and data are needed," said Dr Peter Hollman, one of the experts that produced EFSA's assessment.

Researchers at Lund University, Sweden, have since discovered that nano-sized plastic particles can accumulate in fish brains and cause damage. Whether they could also accumulate in other tissues that are then eaten by us isn't yet clear, but while the evidence to *prove* human harm isn't there, there is plenty to suggest it's a possibility.

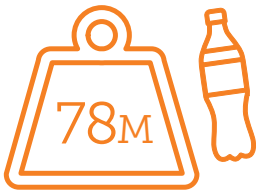
"There is enough information that this is having an impact and has the potential to have a very serious impact," Dr Sherri Mason, a professor of chemistry at the State University of New York, told me recently.

Indeed, what makes plastics interesting is their ability to suck up pollutants (including those that are now banned but still hanging around) as they float around in the sea. Chemicals – like bisphenol A, recognised as an endocrine disruptor and currently the subject of intense scrutiny in Brussels – are also added to packaging. Studying the impact these tiny ticking chemical cocktail bombs have as they are ingested and passed up the food chain is far from easy. "It's called a food web for a reason," Mason says. "It's so interconnected, and trying to untangle it is a little insane, but that's what we do."

> "While the evidence to *prove* human harm isn't there, there is plenty to suggest it's a possibility"

However, so far, they have only scratched the surface. There is an urgent need for bigger, better, and more definitive studies, as Stephanie Wright from King's College London pointed out in a piece for the *British Medical Journal* in September. "Only

PACKAGING BY NUMBERS



tonnes of plastic packaging produced every year

an average 500ml glass of water contains 1.9 plastic fibres

32%

of packaging ends up in the environment

220

marine species ingest microplastic debris 'in natura'

a fraction of dietary components – shellfish, salt, honey, sugar, beer, tap water – have been tested. We need to establish the toxic characteristics of microplastics, their behaviour in the body, and what constitutes a safe threshold for exposure when plastics are either ingested or inhaled."

Afraid of what it might find?

EFSA and the Food Standards Agency also say more research is needed, as does the UK government. In October 2016, it said the chief medical officer (CMO) would "over the next year ... review the effects on health of pollution of several kinds including microplastics". This was in response to an investigation by the House of Commons environmental audit committee. The report is still being compiled, and the Department of Health is keen to play down its significance. "The CMO agreed to consider this issue [microplastics] while scoping topics for her next annual report – but never committed to doing specific research on this," says a spokesman. "The consideration was whether to include this topic in a broader report on pollution and health." (At time of writing, the CMO's report has not yet been published).

Is the government afraid of what it might find? For all its recent rhetoric and grand commitments on plastic use and pollution, (the 25-year environment plan, the ban on microbeads, a call for evidence on potential taxes for single-use plastics), there has been no mention of any possible effects on human health. Some believe this to be a major oversight. "This is a very new area of research, and the fact that microplastics persist in the environment, are very mobile and also show signs of accumulating in wildlife is of great concern," explains Dr Michael Warhurst, executive director at the CHEM Trust. "To put it at its most basic, whatever toxic effects we may find in the future, it is going to be impossible to withdraw all the microplastics from the environment."

Across the Channel, it's a different story. "We must stop plastics getting into our water, our food and even our bodies," said European Commission first vice-president Frans Timmermans when he launched the EU's plastics strategy in January. Read through the strategy and there are half a dozen references to human health.

This isn't an attempt to turn the issue into a *Daily Mail* food scare; rather, it's a bid to kick member states and businesses into action before it becomes one. In the next 20 years, production of plastic will double, according to the Ellen MacArthur Foundation. "The problem is wide-scale and the concentrations are low," says Richard Thompson, professor of marine biology at Plymouth University in the UK. "But if we carry on as normal and have this conversation again in 20 years' time, we may well have reached concentration levels that are a concern."

For Mason, there are lessons to be learned from climate change policies and "past mistakes" as world leaders dillied and dallied to strike a global commitment. "We are sounding the alarm loudly because of what happened with climate change," she says. Some concrete new policies on plastic reduction, reuse and recycling would help, but businesses may well have to step up to the plate. Some have wasted no time in bids to become plastic-free pioneers.

Supermarket chain Iceland is to eliminate all plastic packaging from its own-brand products by 2023, for example. "Time is running out for plastic," read a full-page advert in a January issue of *The Guardian*. "For over 40 years, we've relied on it to package our products. It's cheap, light and easy. It's also clogging up our oceans. Harming sea life and getting into the food chain." The retailer said "future generations shouldn't have to pay for tonight's dinner" – especially if it's riddled with tiny pieces of toxic plastic.

DAVID BURROWS is a freelance journalist

All change for SAFETY

Richard Clarke uses his experience of international standards to shed some light on the upcoming ISO 45001 for managers

With the new international health and safety standard, accredited companies will have up to three years to migrate from OHSAS 18001 to ISO 45001. For those environmental managers who have already transitioned to ISO 9001 and 14001, much of this process will be familiar, with the standard moving to the Annex SL higher level common structure.

A new structure

By basing common elements on the Annex SL structure, greater ease of integration will be possible. It is likely that methods such as a PESTLE analysis will have laid the groundwork for safety scoping.

At the same time, senior managers should already be familiar with the extended requirements of Annex SL in relation to demonstration of top-level commitment, with only minor changes needed to include safety management.

Risks versus hazards

Where 14001 managers will be familiar with the idea of risk and opportunity in the environmental standard, the situation is less clear in 45001. With risk defined in Annex SL as the effect of uncertainty, the ISO committee have had to juggle linguistically with safety risks as understood through the risk assessment process. Within the standard, therefore, safety risks as identified through risk assessments are referred to as 'hazards' to distinguish from risks to the fulfilment of safety management system objectives.

However, failure to manage a known safety hazard would become a system risk in terms of the policy-level commitments to eliminate hazards. Confusion with these terminologies is likely, so care will need to be taken in writing procedures and communicating and training staff, particularly where they will participate in risk and hazard assessment activities.

Where the standard differs from OHSAS 18001, other than the requirements arising from Annex SL, the changes may well look familiar to safety managers. These changes include many elements that are already present in UK law as core legal safety requirements, and therefore already being addressed to ensure legal compliance.

Worker participation

The biggest change in the standard in relation to worker participation is, predictably, one that caused much debate and redrafting during development.

For many organisations, worker participation is an intrinsic part of their safety management culture, yet such collaborative arrangements are likely to have developed organically with the development of the safety management system, rather than being led by specific requirements within the standard.

The new requirements set out where worker consultation and participation should be emphasised, including:

- Consultations on the establishment of policy and safety objectives
- Determination of controls for outsourcing, contractors and planning and implementation of audit programmes
- Participation in hazard assessment
- Assessments of risks and opportunities
- Identifying competency requirements
- Designing control measures, and
- Investigations of incidents and non-conformities.

Engagement is vital

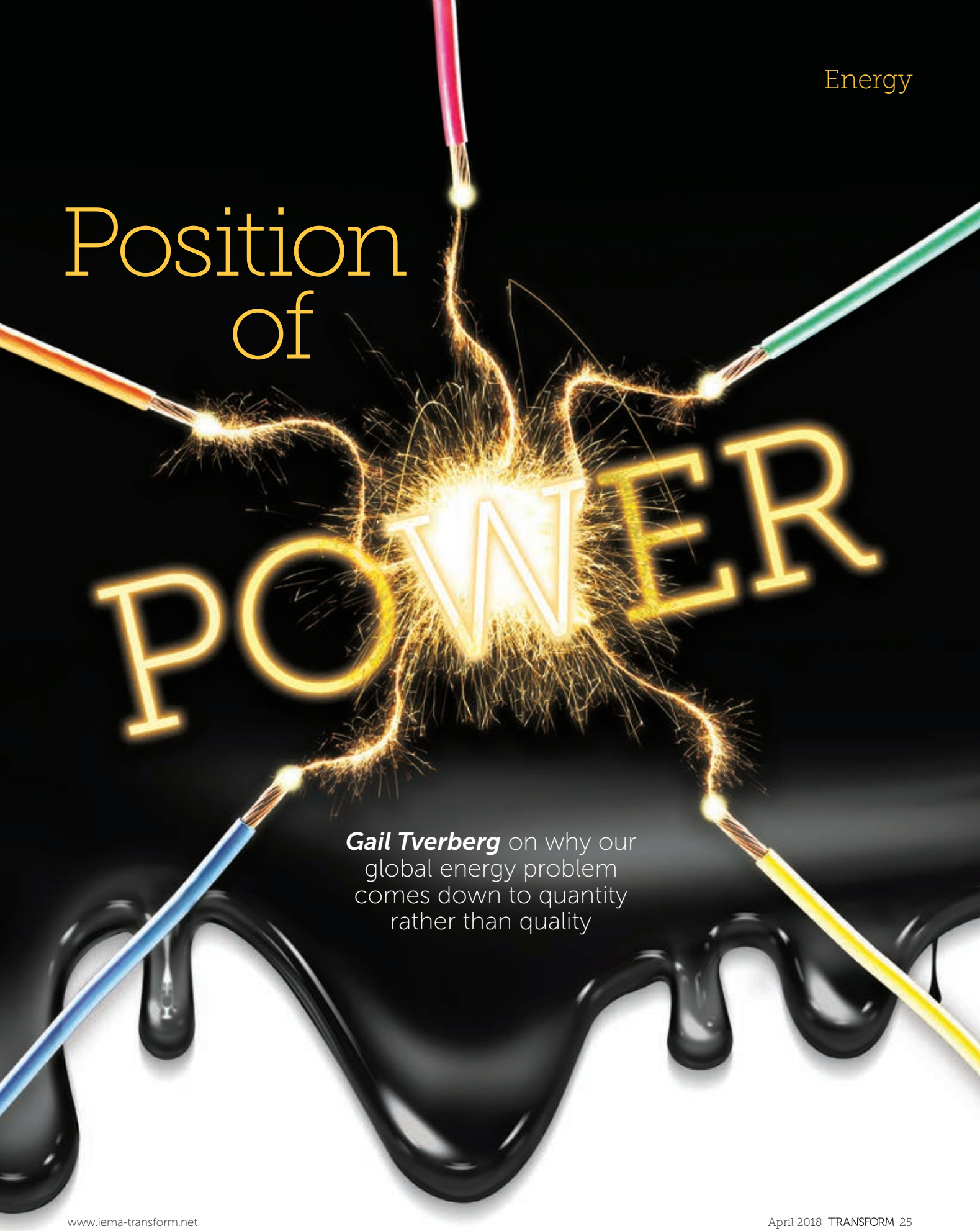
While many safety professionals would agree that consultation and participation are key factors in any safety management system as well as in the corporate safety culture, elements of these requirements will demand a more representative approach to safety assessment, planning and implementation than is the case under 18001.

Without senior management engagement, delivery to an auditable standard may pose difficulties.

Migration to the new standard will require careful planning, but represents an opportunity for organisations to move their safety culture to the next level, increasing participation across the organisation, delivering enhanced legal compliance, and setting the bar with top-level management engagement.

RICHARD CLARKE
is a senior consultant at Cedrec Information Systems

Position of POWER



Gail Tverberg on why our global energy problem comes down to quantity rather than quality

Reading many of today's energy articles, it is easy to get the impression that our energy problem is a quality problem—some energy is polluting, while other energy is hoped to be less polluting.

There is another issue though that we are not being told about. It is the fact that having enough energy is terribly important as well. Total world energy consumption has risen quickly over time. In fact, the amount of energy consumed, on average, by each person (also called 'per capita') has continued to rise, except for two flat periods.

There is a good reason why energy consumed has risen over time on a per capita basis. Every human being needs energy products, as does every business. Energy is what allows food to be cooked and homes to be heated. Energy products allow businesses to manufacture and transport goods. Without energy products of all kinds, workers would be less productive in their jobs. Thus, it would be hard for the world economy to grow.

When energy consumption per capita is rising, it is easy for workers to become more productive because the economy is building more tools (broadly defined) for them to use, making their work easier. Manufacturing cell phones and computers requires energy. Even things like roads, pipelines, and electricity transmission lines are built using energy.

Once energy consumption growth flattens, as it did in the 1920-1940 period, the world economy is negatively affected. The Great Depression of the 1930s occurred during this flattened consumption period. Problems, in fact, started even earlier. Coal production in the UK started to drop in 1914, the same year that the First World War began. The Great Depression didn't end until the Second World War, immediately after the 1920-1940 flattened consumption period. During this period, many people, especially farmers, were not able to earn an adequate living. This situation is not too different from today, when many young people are unable to earn an adequate living. Strange as it may seem, this type of wage disparity is a sign of inadequate energy per capita, because jobs that pay well require energy consumption.

The 1980-2000 flat period was in many ways not as bad as the earlier one, because the lack of growth in energy consumption was planned. The US changed to smaller, more energy-efficient cars to reduce the amount of gasoline consumed. Oil-powered electricity generation was taken out of service and replaced with other types of generation, such as nuclear. Heating of homes and businesses was moved to more efficient systems that did not burn oil.

The indirect effect of the planned reduction in oil consumption was a drop in oil prices. This adversely affected all oil exporters, especially the Soviet Union. Its central government collapsed, at least partly because of its reduced revenue stream. Member republics continued to operate, somewhat as in the past. Russia and Ukraine cut back greatly on their industrialisation, leading to less use of energy products. Populations tended to drop, as citizens found better work prospects elsewhere.

> Wage disparity is a sign of inadequate energy per capita, because jobs that pay well require energy consumption

Eventually, in the early 2000s, oil prices rose again. Russia was able to become a major oil exporter again, but Ukraine and other industrialised areas were totally handicapped by the collapse. Countries affiliated with the Soviet Union (including Eastern European countries, North Korea, and Cuba) found themselves consistently lagging behind the US and Western Europe.

Recently (2013-2017), the world economy seems to have again reached a period of flat energy consumption, on a per capita basis. In many ways, the flattening looks like that of the 1920-1940 period. Increased wage disparity is again becoming a problem. Oil gluts are again becoming a problem, because those at the bottom of the wage hierarchy cannot afford goods using oil, such as motorcycles.

Compared with their parents, young people are finding their standards of living falling. They cannot afford to buy a home and have a family. Governments are becoming less interested in cooperating with other governments.

Why is world energy consumption per capita flat, or actually falling slightly, after 2013? The answer seems to be diminishing returns with respect to coal production. Diminishing returns refers to the fact that while at first coal is inexpensive to extract, the cost of extraction rises after the thickest seams and those closest to the surface have been extracted.

A chart of China's energy production shows how the country's coal production first rose as its low cost made its usage advantageous, and then fell owing to diminishing returns. It experienced a major ramp-up in coal production after it joined the World Trade Organization in 2001.

As the extraction of coal progressed, China found itself with many mines experiencing rising production costs. Coal prices did not rise to match the higher cost of production, so, from about 2012, a large number of unprofitable mines were closed.

A major reason for the flat world per capita energy consumption, which began in 2013, is the corresponding fall in China's coal production after 2013. As the cost of production rises, and as users become aware of coal's environmental issues, production is falling in a number of other countries too. Other sources of energy have not been rising sufficiently to keep total per capita energy consumption rising.

The chart on Energy Production in China illustrates that wind and solar production are not rising sufficiently to offset the nation's loss of coal production (wind and solar are covered by the 'Other Renewables' category.) This situation occurs elsewhere as well.

Wind, solar and the problem of scale

What role do wind and solar play in maintaining world energy supply? The truth is, very little. While a great deal of money has been spent on them, wind and solar together amounted to only about 1% of total world primary energy supply in 2015, according to the International Energy Agency.

A major problem is that wind and solar do not scale well. As larger quantities are added to electricity networks, more workarounds for their intermittency (such as batteries and long-distance transmission) are needed. Bid prices for wind and solar give a misleadingly low impression of their real cost, unless the projects include many hours' worth of storage to offset the impact of intermittency.

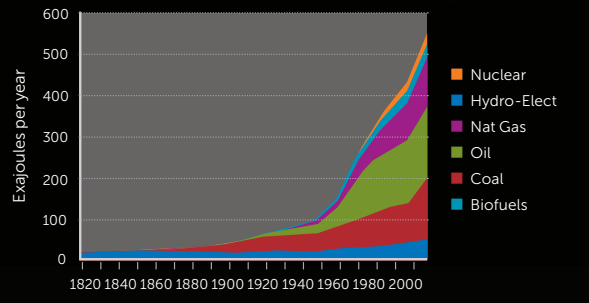
The key to rising energy consumption seems to be the falling cost of energy services, when efficiency is included. For example, the cost of delivering a package of a given size a given distance must be falling, relative to inflation. Similarly, the cost of heating a home of a given size must be falling. Governments must be able to tax producers of energy products, rather than providing subsidies.

Globalisation requires ever-expanding energy supplies to meet the needs of a rising world population. To maintain globalisation, we need a growing supply of energy products that are very cheap and scalable. Unfortunately, wind and solar don't seem to meet our needs. Fossil fuels are no longer cheap to extract, because we extracted the resources that were least expensive to extract first. Our problem today is that we have not been able to find substitutes that are sufficiently cheap, non-polluting, and scalable.

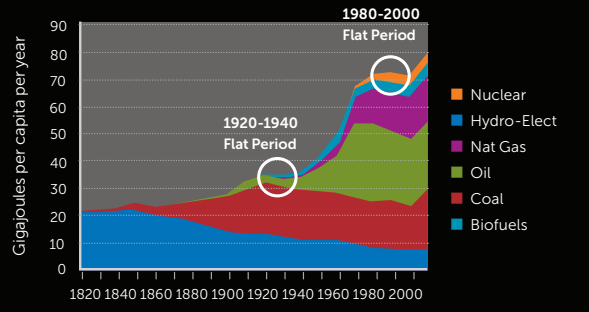
GAIL TVERBERG is a researcher writing at OurFiniteWorld.com

CONSUMPTION AND PRODUCTION

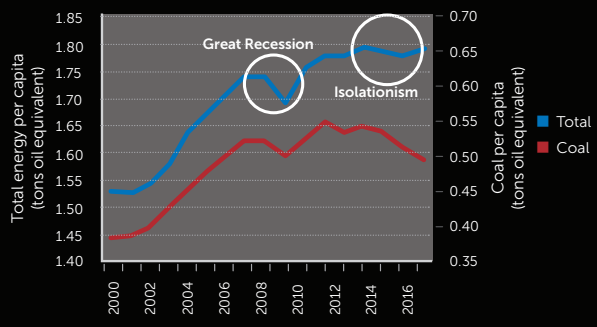
World Energy Consumption



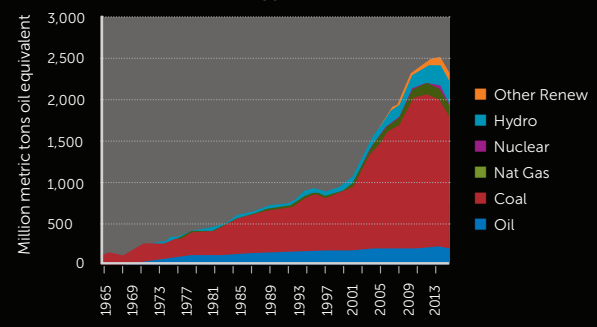
World Per Capita Energy Consumption



Total Energy And Coal Consumption Per Capita



China's Energy Production



All charts courtesy of Gail Tverberg, OurFiniteWorld.com

THIS MONTH WE ASK...

How can we change consumer behaviour to become more sustainable?

LUCY SIEGLE

Reporter on *The One Show* and writer on environmental issues

'A mindful strategy is key... to break cycles'

Last year, the global fashion industry smashed through the 100-billion-garments-a-year barrier. We've never churned out that many garments before, most from virgin resources. And some of the brands preaching loudest on sustainability are driving this rapacious engine of production, consumption and generator of waste. The current system is certainly set up in their favour.

Neurological research on fashion shoppers found that buying at speed, at volume and low price (ie fast fashion) is quasi addictive. So why on earth would any consumer be persuaded to shop differently? But, to my delight, many are. There is a small but significant rise in mindful fashion consumption.

For a long time, it has been supposed that only brands could drive this change. Now advice is increasingly peer driven. Some years ago I included in my book on ethical fashion, *To Die For*, a 30-wears rule. If I couldn't look at a piece of clothing on a rail and commit there and then to wearing it 30 times I left it. Now hashtagged #30wears, it has a digital life of its own and I see it passing between millennials and generation Z-ers. It's been refashioned as a life hack for mindful living.

A mindful strategy is key. Given the addictive qualities of consuming and the pressures to consume so frequently, a slower, purposeful strategy allows shoppers to break cycles. It gives them freedom and control.

TARA BUTTON

CEO, BuyMeOnce

'The easiest thing we can do is to buy for the long term'

It's so easy to impulse-buy a cheaply made umbrella or pair of jeans, but when they collapse in the wind, or rip in the crotch within a few months, we end up paying for the same shoddy stuff again and again. The shops are happy, but this is terrible for the planet and can even trap people into cycles of poverty if their big appliances break every few months.

The easiest thing we can do for our planet is to buy for the long term. Simply getting a t-shirt to last two years instead of one saves 24% of your carbon emissions. Think of the impact if we bought everything to last!

Buying for the long term means buying quality, so it's more expensive upfront, which puts consumers off. However, if consumers had the hard facts on how much money they can save over time, this might change behaviour. We buy, on average, 1.1 umbrellas a year, and could save around £700 if we bought one for a lifetime. Sadly, much of the information on product lifespan is missing. I'm campaigning to get labels put on all appliances saying how long they last under normal usage.

The other side is psychological. So many messages are designed to make us feel dissatisfied with what we have. We're constantly told we need to refresh. I believe in empowering people to discover their true tastes, what really suits them and their purpose, so they are less swayed by these fads. Only then will they be free to buy better.

SARAH WAKEFIELD

Food sustainability manager, The Co-op

'By thinking as citizens rather than consumers'

We know that most customers don't want food that has a negative impact on the planet or people – but often they will look to others to make the change. This is sometimes called the value-action gap.

Retailers continually work to make products more sustainable, in a way that isn't always obvious to shoppers – such as through certifying raw materials or nudges on labelling. But individual behaviour still has a huge role to play.

An example of this would be food waste. With a third of all food being wasted, and food farm to fork representing 25%-33% of all greenhouse gas emissions, we won't be able to tackle climate change without reducing waste.

We have heard a lot about what retailers need to do to cut waste, and plans are going ahead on this. But 70% of the food wasted in the UK is in the home. So the biggest impact we can have is to change the social norms in our own homes and in wider society; thinking as citizens rather than consumers.

Once the desire to change is present – most topically at the moment around plastic recycling – we need to also recognise the effect of infrastructure and policy. It is one thing to create a social norm around recycling, sustainable choices and healthy lifestyles and another to make it easy to achieve.

We need everyone pointing in the same direction and recognising the moves we all need to make rather than pointing a finger at others to make changes.

CAREER PROFILE

Tertius Beneke FIEMA CEnv

Group environmental manager, Qatar Airways

Why did you become an environment/sustainability professional? For me, the profession combined my love of nature, my need to protect this planet and contained enough variety to keep me constantly challenged and engaged.

What was your first job in this field? I started out as an environmental specialist for Network Rail in its maintenance department. The aim of the role was to champion environmental management throughout the UK's south-east rail network and covered some very interesting work, such as managing sites of special scientific interest and creating a small nature reserve at Hither Green railway station. This provided me an amazing opportunity to learn from other environmental professionals in the department. As my first role, their support and guidance was invaluable.

How did you get your first role? I took a non-environmental position within Network Rail, obtaining consents to install telecommunication masts along the railway. The consents included several environmental aspects and I used this experience to secure my first environmental job.

What does your current role involve? I am the group environmental manager for a global aviation company. My main tasks are to create an environmental management system that will give a structured approach to environmental management across the company's 44,000 employees and eight discrete businesses. To support and enable behavioural change, I have implemented environmental and sustainability requirements in job descriptions, and we are in the process of rolling out related sustainability training for the group. On a day-to-day basis, I work with business units to embed environmental and sustainability requirements into their processes, dealing with issues like supply chain management, resource efficiency and whole life cost / life-cycle thinking.

How has your role changed/ progressed over the past few years? It has moved from being mainly field-based, tactical and hands-on to being more strategic, long-term and office-based.

What's the best part of your job? Working with people in business units and helping them affect real-world change that reduces our environmental impact – there is nothing better than that for me. Even something as simple as reducing waste makes me very happy.

What's the hardest part? Convincing senior leaders and middle management of the importance of this planet and how their role can or should contribute to the protection and enhancement of it.

What was the last development event you attended? My last development event was in Doha, Qatar, at the regional IEMA event. I also attend the IEMA Fellow workshops in London on a regular basis.

What did you bring back to your job? The Fellow event brought to my attention the Islamic Reporting Initiative, created by an IEMA Fellow.

What are the most important skills for your job? Perseverance, communication and understanding the pressures that delivery unit personnel deal with. To be most effective, we must integrate our interventions into existing processes and behaviours, so we must be as informed as possible to reduce disruption to delivery and improve adoption and implementation of responsible business practices.

Where do you see the profession going? I think the profession is becoming more mainstream. Younger generations expect environmental and sustainability issues to be very well managed as standard. The high-profile surge in renewable energy is providing us with a great platform for change.

I believe that responsible financial investment will not be far behind in moving to a decarbonised investment model, which will drive global shifts in many industries.

Where would you like to be in five years' time? In five years, I would like to still be contributing to the profession. Personally connecting with global leaders on this topic is on my development list – hopefully somewhere close to some good surf!

What advice would you give to someone entering the profession? Connect with your passion and use it to drive your career. We tend to be good at the things we like. I once attended a speech by American former astronaut Buzz Aldrin, where he said "be ambitious and be patient". This helped me find balance, as the profession can sometimes be frustrating and slow to change.

How do you use the IEMA Skills Map? Personally, I use it to drive my environmental and sustainability competencies and personal development. I have also used it professionally in my last two organisations to create environmental competencies for all staff, followed by training programmes to drive behavioural change.

The high-profile surge in renewable energy is providing us with a great platform for change

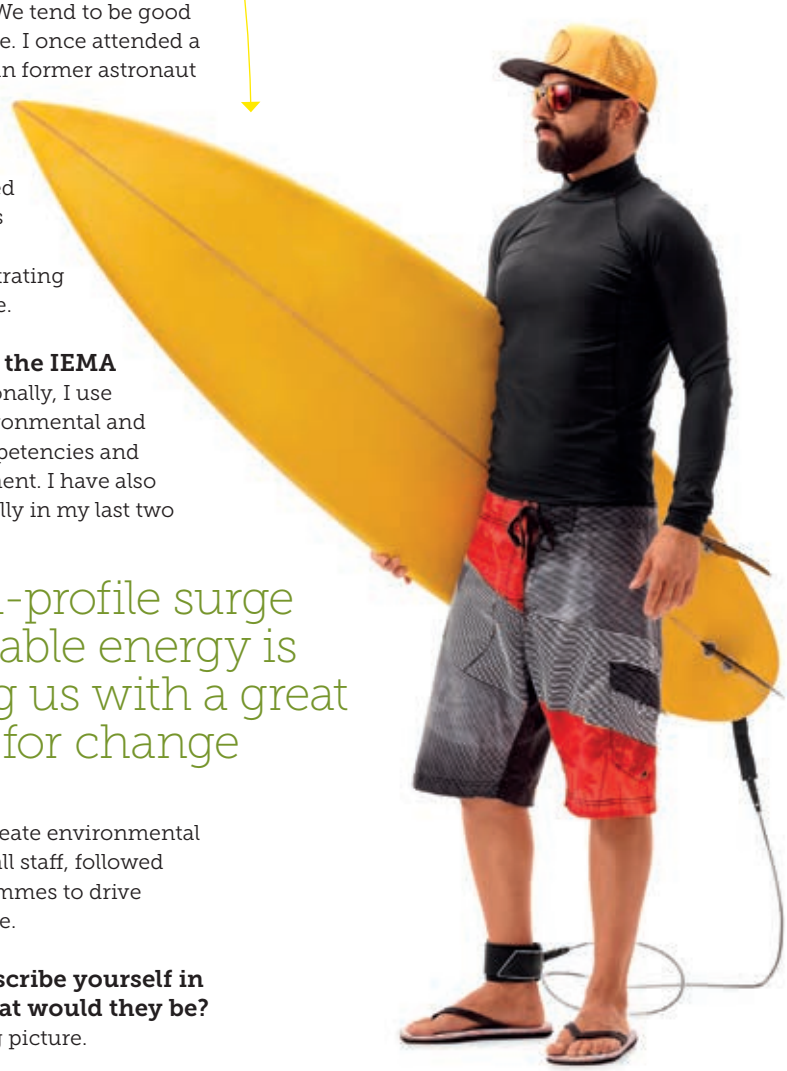
If you had to describe yourself in three words, what would they be? Serious, driven, big picture.

What motivates you? I need to make a difference and leave this planet just a fraction better off than when I started.

What would be your personal motto? 'Vasberadenheid' – the Afrikaans word for determined. I'm not the fastest or the smartest, but I am nothing if not determined.

Greatest risk you have ever taken? Leaving my home and family in South Africa to work in the environmental sector in the UK.

Visit www.iema-transform.net for the full member profile



CONNECT

SOCIAL AND COMMUNITY NEWS FROM IEMA

APPOINTMENT

Oxford Brookes University appoints IEMA Fellow as visiting professor

The appointment of Professor Martin Broderick recognises his contributions to environmental and social impact assessment (ESIA) and sustainability issues over 25 years.

Broderick has provided service and leadership, in an executive role, on advisory boards of national and international agencies. He has also made contributions to leadership in government and corporate bodies, professional institutes, and community services. He is regarded as a leading practitioner and an intellectual leader in the ESIA field.

Professor Broderick said: "I am thrilled to receive this appointment. It is not only recognition of the lasting contribution to the impact assessment academic community made by Oxford Brookes but also a great inspiration to strengthen my research in this area."

NEWS CALL: We want to hear all about members, your activities and achievements. To update your colleagues on events that have taken place and successes to celebrate, submit a 100-word story with photos to the editor: **sharon.maguire@redactive.co.uk**

QUOTE UNQUOTE

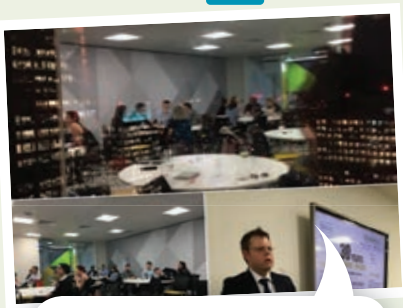
Great privilege to host @iemanet CEO @TimBalconIEMA and COO, Maria. We talked them through our approach to #sustainability here @Adnams and of course showed them around the #brewery & #distillery. Putting my membership into practice! #IEMA #Adnams – at Adnams

@BENEDICTORCHARD

Heading for the @*SustHealthCare* conference in Bristol reading my *IEMA_Transform* magazine on the bus... It's going to be a great day! Oh and the sun is shining! #miniwin

@brizzlegreenie

LinkedIn



Brilliant evening speaking with a very engaged *IEMA* Futures Group. Together we will shape the future we want and deserve. *Sandra Norval MBA MIEMA CEnv Katie Atherton BSc(Hons) PIEMA* Martin Gettings CEnv MIEMA group head of sustainability at Canary Wharf Group Plc

WEBINARS

18 APRIL

The Future of Environmental Auditing

Join our upcoming webinar to explore some of the findings of this study as we prepare our future strategy for the provision of auditors. You'll be led by Nigel Leehane, an IEMA Fellow, principal environmental auditor and chair of the ISO environmental auditing committee, to explore these issues.

To register: bit.ly/2FWZQXp

24 APRIL

Environmental Legislation in Post-Brexit Britain

Learn about gaining IEMA Full Membership and Chartered Environmentalist status, including the competencies, assessment process and support tools designed to help you progress your application. If you're thinking about applying for Full Membership, this webinar is perfect for you.

To register: bit.ly/2pomGwP

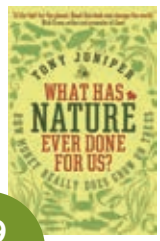
LAUNCHING THE NEW IEMA BOOK CLUB

Would you like to learn from some of the most influential sustainability thinkers of today and discuss their ideas with your peers? IEMA is offering you the opportunity to do just that with our new book club.

19 April

The first discussion will be hosted via a webinar on 19 April, and you will be able to join in the conversation live and share your thoughts.

It will be hosted by Marek Bidwell, who established the sustainability book club, 'Green Thinkers'. Marek says: "The book-club format helps me to keep my sustainability knowledge up-to-date, and, by bouncing ideas around in the discussions, I also learn from others in the group, and gain practical insights."



Our first book, *What Has Nature Ever Done For Us?* by Tony Juniper, offers a fascinating insight into the value that nature provides for people, organisations and countries around the world.

All you need to do is read the book and sign up for the webinar.

Register for the webinar at: bit.ly/2InkjTj

WHAT'S ON THIS MONTH

iema.net/events

10 APRIL

IEMA Scotland East social

An opportunity to meet members from within and outside the network, catch up with old connections, and extend your network as you meet others. This is an informal event: no speaker and no set agenda, just a relaxed opportunity to get to know other members, and exchange ideas and approaches. Come along and meet some new people or catch up with old acquaintances.

To register: bit.ly/2G4SUYl

12 APRIL

Innovative engineering: Drax Power Station visit

Drax Group plc is playing a vital role in helping change the way energy is generated, supplied and used as the UK moves to a low-carbon future. The visit will include a tour of the site, with the main focus on the environmental agenda for Drax.

To register: bit.ly/2FxSycX

26 APRIL

Let's Transform Sussex and Surrey with IEMA

Join us for our upcoming event, where you'll hear from IEMA's CEO, Tim Balcon, on exciting developments for the area. We'll explore progress around sustainability challenges in travel, tourism and transport, with speakers from organisations around the region, including Govia Thameslink Railway and Hilton London Gatwick. Our keynote speaker, Professor Dave Cooper from the University of Chichester, will talk about how creativity and innovation are key to transforming the world to sustainability.

To register: bit.ly/2EE7pht

LATEST MEMBER UPGRADES

ASSOCIATE (AIEMA)
Mark Elgie, Environment Agency
Alan Rose
Kirsty Dunne, Geoffrey Osborne Ltd
Alberto Pavano, Groundsure
Scott Pape
Katherine Ebert, Randox Laboratories
Matthew Malorey
Fiona Gutteridge, Ridge Environmental Ltd
Stenia Walker, Sodexo Ltd
Afshan Shah, Wandsworth London Borough Council
Andrea Moir, Stork Technical Services UK Ltd
Erik Walmsley, WWF-UK
KO BTS Group
Bernadette Prosser
Lee Townend, Suez
Gillian Thomson, Argent Group plc
Louise Grundy, LC Consulting and Training Solutions Ltd
Greg Altria, SLR Consulting Ltd
Craig Cole, Action for Children
Alex Branton
Mark Saunders, North Devon District Council
Leigh Holland, Airbus Group Limited
Alexandra Hargreaves, Wakefield and District Housing

PRACTITIONER (PIEMA)
Stacey Downes, Element Sustainability Ltd
Simon Bell, Epping Forest District Council
Anita Phillips, Historic Royal Palaces
Alyn Tomkinson, Walters UK Ltd

Dorian Banks, Johann Borgers GMBH
Eleanor King, Jacobs UK Ltd
Jenny Minford, MWH UK Ltd
Clare Tait, Kier Construction Central
Andrew Bradbury, Alstom Grid UK Ltd
Iain Perkins, Kaby Engineers
Jennifer Cunningham
Lauren Jenkins, Faithdean
Cormac Cleary, University of Westminster
William Forbes, Groundwork London
Koku Awuma
Katherine Robinson
Sarah Wilkinson, Wave Action
Jerome Salle
Bibiche Miakembo
Mulemangabo Bisimwa

FULL MEMBERSHIP WITH CHARTERED ENVIRONMENTALIST (MIEMA CENV)
Voirrey Costain, Jacobs UK Ltd
John Johnson, Arup
Barry Corrigan, Roughan and O'Donovan
Hanne Larsson, Arcadis Consulting (UK) Limited
Leslie Morris-Iveson, Environmental Recovery Consultants
Michael Jones, Waste & Resources Action Programme
Richard Collins, General Electric

FELLOW (FIEMA)
Robert Carr, Fellow Member, Employer - WSP Middle East Ltd

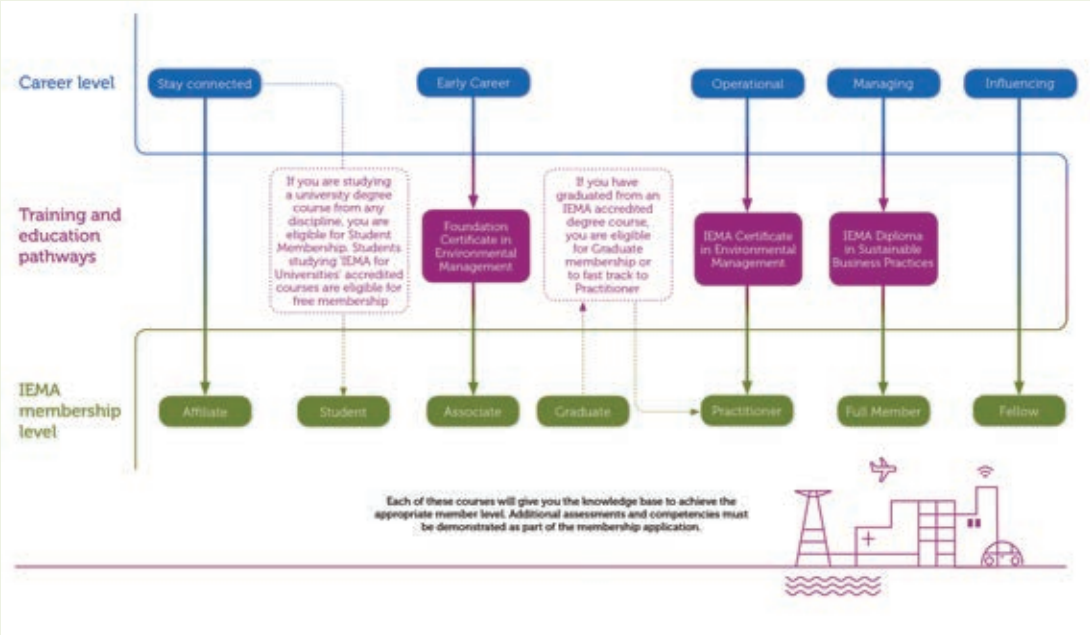
ENHANCE YOUR PROFILE AND YOUR SALARY BY UPGRADING YOUR MEMBERSHIP

Upgrading your IEMA membership is a great way to boost your professional recognition, your influence at work and, according to our *State of the Profession* report, your earnings.

Our research says Full Members earn over £12,000 a year more than Associates, who take home £10,000 more than Graduates earlier on in their careers.

But how do you upgrade? If you feel ready, or want to gain some high-quality training along the way...

Go to www.iema.net/training to find out more about upgrading via our courses and Approved Training Partners



IEMA Transforming the world to sustainability

IEMA Extraordinary General Meeting 2018

Company Name: The Institute of Environmental Management and Assessment
Company Number: 03690916

NOTICE IS HEREBY GIVEN that an Extraordinary General Meeting of the Institute of Environmental Management and Assessment ("IEMA") will be held at 18:00hrs on Tuesday 15th May 2018 at Vintners' Hall, 68 Upper Thames Street, London, EC4V 3BG.

Special Resolution

"It is hereby resolved that
The Board of the Company ("the Board") be, and is hereby authorised to execute and submit, on behalf of the Company, a Petition to Her Majesty in Council, in the form annexed to this Resolution, seeking the grant of a Royal Charter incorporating a new chartered body ("the Institute") and that in the event of the said Charter being granted and coming into force, the entire undertaking of the Company shall be transferred to the Institute and, such transfer having been completed and the Company having no assets, debts or other liabilities, the Board be, and is hereby, authorised to take all necessary steps to arrange for the Company to have dormant status."

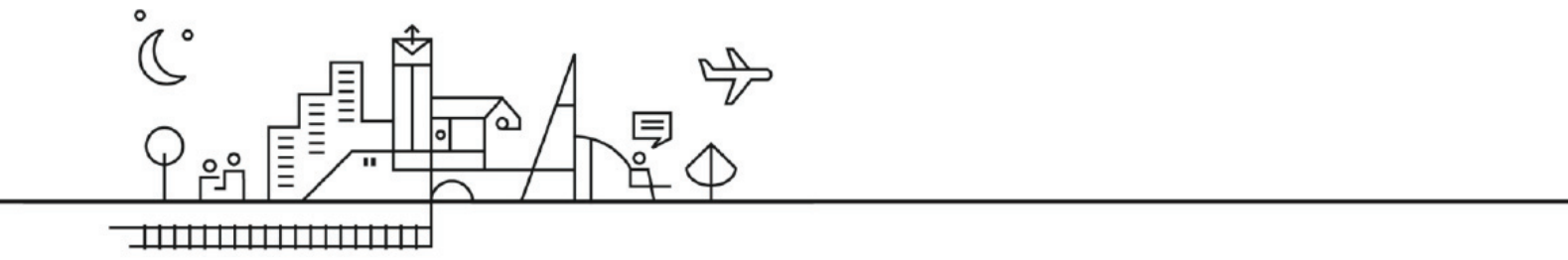
Martin Baxter
Company Secretary
IEMA, City Office Park, Tritton Road, Lincoln, LN6 7AS, United Kingdom

Notes

Further information regarding the Charter, Bye Laws and Petition which are annexed to the Special Resolution can be found at **www.iema.net/egm2018**. Every Member is entitled to attend and vote at the meeting. Any Member will be entitled to speak at the meeting on any matters arising out of this Special Resolution, but no other business will be transacted at the meeting.

Every Member not able to attend is entitled to appoint a proxy to attend on their behalf and, on a poll, vote on his/ her behalf. A proxy need not be a Member of IEMA.

A template Proxy Notice can be found at **www.iema.net/egm2018** and shows all the information that is required by IEMA in this circumstance. Completion and return of a Proxy Notice will not prevent a Member from attending and voting at the meeting in person should he/ she wish to do so. All proxies so appointed should be notified to IEMA in writing, by no later than noon on Monday 14th May 2018, to the following name and address: Ann Guest, Governance Officer, IEMA, City Office Park, Tritton Road, Lincoln, LN6 7AS, United Kingdom.



TAKE YOUR CAREER TO THE NEXT LEVEL

STAND OUT WITH AN IEMA DIPLOMA

With an IEMA diploma you are equipped with the strategic sustainability knowledge and skills to drive your business's agenda. And, by gaining the knowledge needed for full membership of IEMA, (MIEMA) and Chartered Environmentalist status (CEnv) you're a step closer to being recognised as an elite of the profession.

"I have thoroughly enjoyed the course. It has been a great opportunity to expand my knowledge on a variety of sustainability topics outside those that I encounter on a daily basis and to engage with others working in the sector. I have taken a lot away that I will use throughout my career."

Kimberley Lasi, Environment Officer | IEMA Diploma

At EEF, we don't just deliver training we are setting the benchmark and are the only provider for the **IEMA Diploma in Sustainable Business Practice**.

eef The manufacturers' organisation

0845 293 9850
www.eef.org.uk/training