THE EMA MAGAZINE

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CELEBRATING

10 YEARS

ema energy managers association

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TECA Energy Centre – two years on

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THE EMA MAGAZINE

Dear Reader,

This year we are celebrating the EMA's 10-year anniversary. Over the decade we have gone from being a small and slightly chaotic start-up to a full-fledged organisation with a membership community of several thousands, and a dedicated team who run the Association like clockwork.

In my time with the EMA, the organisation has grown larger and become more coherent voice of energy management and a truly representative body for energy managers and professionals from associated fields. The aspect of the EMA that I value the most is that it brings together people who are keen to advance the profession and who share our drive to highlight the importance of energy management and the role of energy managers. Aligning with and supporting our aspiration of sharing, challenging, discovering the energy management practices and external connections have contributed to the EMA being recognised as an instrumental player in disseminating information and expertise on energy efficiency, decarbonisation, net zero, policy development, training and professional recognition.

Many of these matters represent the main feature of this latest issue. The current EMA Board members reflect on how the energy management industry evolved over the past 10 years and where they see its future. Similarly, the former Board members share insights into what attracted them into the profession and their views on where the profession is heading.

The first 10 years of the EMA have created a great base to build on. We look forward to continuing to build on the EMA's vision and purpose, and growing our focus and initiatives to showcase the importance and quality of energy managers' work. We hope that you will continue supporting us along the way and ensuring that we remain open, inclusive and relevant to your work and profession.

Happy anniversary EMA!

Yours,
Jana Skodlova, CEO, The Energy Managers Association

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The EMA would like to thank to the above contributors for their time and effort in providing the content and making this issue possible. Their willingness to share experience and knowledge is exemplary and inspiring, and we hope it will encourage others to come forward and contribute in the future.

ADVERTISING SALES
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ABOUT EMA
The Energy Managers Association (EMA) was set up in February 2012 and represents Energy Managers across all industries. Our priority is to improve the position of energy management experts and their profession and act as their united voice. We aim to develop the skills, knowledge and experience of professionals through our training, high-quality peer to peer guidance and best practice exchange.

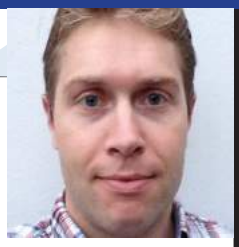
10 YEARS OF THE ema energy managers association

> THE ENERGY MANAGERS ASSOCIATION (EMA) WAS SET UP 10 YEARS AGO THIS MONTH WITH THE AIM TO IMPROVE THE POSITION OF ENERGY MANAGEMENT EXPERTS, THEIR PROFESSION AND ACT AS THEIR UNITED VOICE. OVER THE YEARS THE EMA HAS BROUGHT TOGETHER SOME OF THE MOST RESPECTED NAMES IN THE ENERGY MANAGEMENT INDUSTRY WHO HAVE HELPED TO SHAPE THE PRACTICAL TRAINING COURSES FOR ENERGY MANAGEMENT PROFESSIONALS AT ANY POINT IN THEIR CAREER. WHILST THE ENERGY MANAGEMENT INDUSTRY IS EVOLVING AND EXPANDING, THE FOUNDING PRINCIPLES FROM 10 YEARS AGO OF THE NEED FOR KNOWLEDGE EXCHANGE, BEST PRACTICE, AND PUTTING ENERGY MANAGEMENT AT THE HEART OF BRITISH BUSINESS CONTINUE TO RESONATE TODAY.
>
> LORD REDESDALE, FOUNDER OF THE ENERGY MANAGERS ASSOCIATION

ENERGY MANAGEMENT – PAST AND FUTURE

Ben Burggraaf, Gillian Brown, Caroline Holman and Martin Gannon evaluate a decade of the energy management industry.

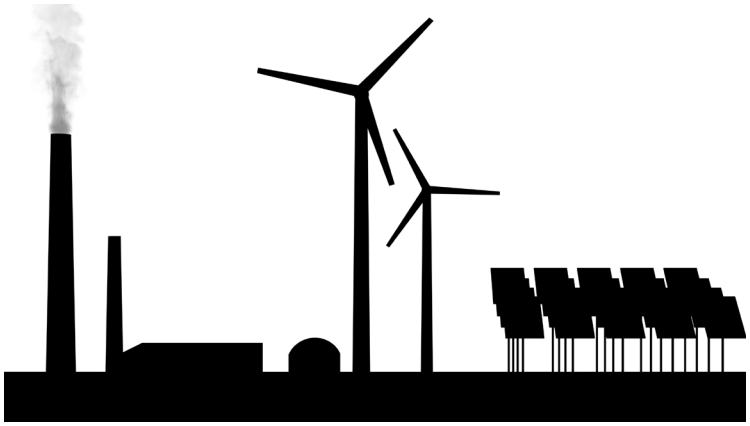
by Ben Burggraaf, Chairman of the EMA Board of Directors and Head of Energy Optimisation at Welsh Water



The transition of the electricity network to low carbon power generation and the associated increase in non-commodity charges have been the drivers for change

How has the energy management industry evolved over the past 10 years?

The transition of the electricity network to low carbon power generation and the associated increase in non-commodity charges have been the drivers for change in the energy management industry over the past 10 years. Historically the commodity, or wholesale, cost of energy (gas & electricity) determined over 70% of the unit cost and therefore the total energy costs of many businesses.



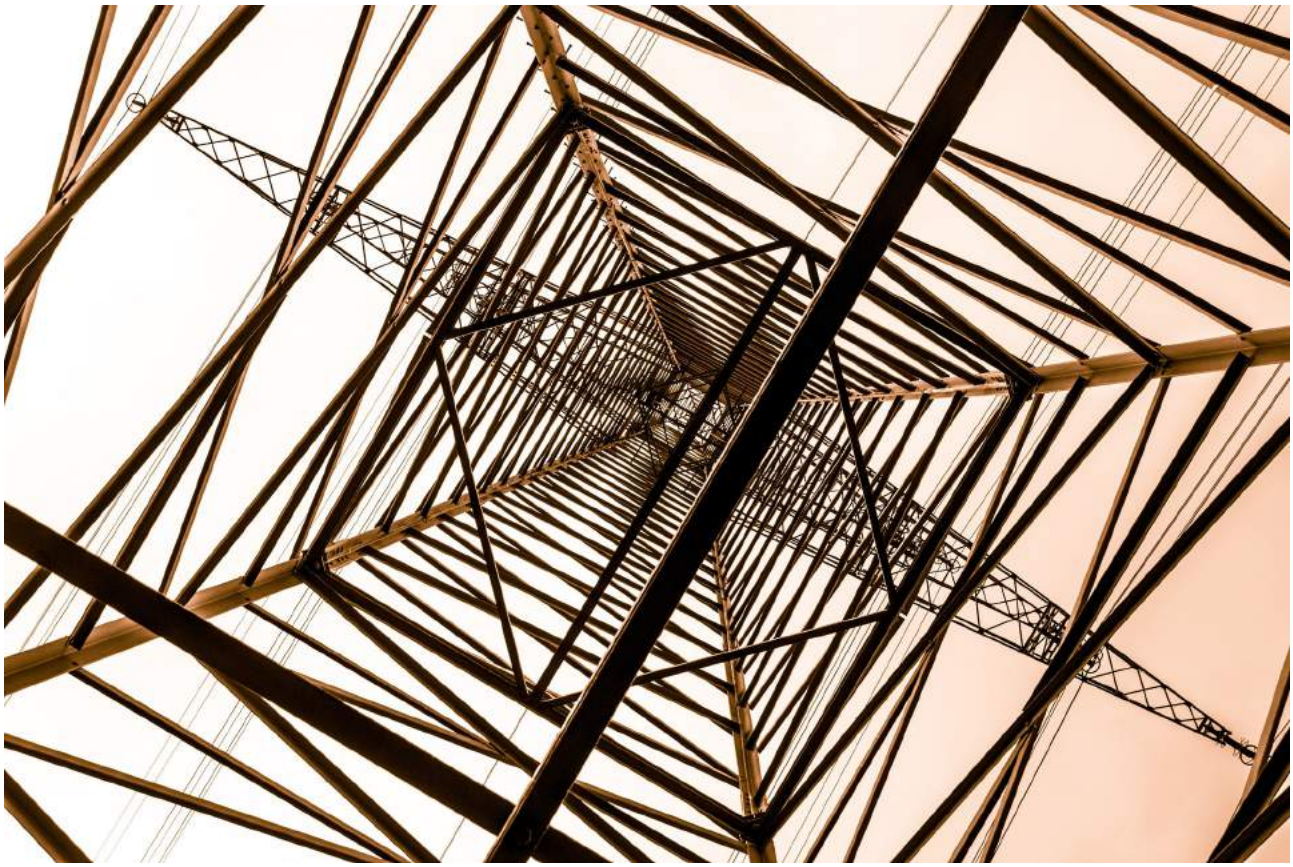
Given the relatively high supply margin (>25%), i.e. available generation capacity versus peak electricity demand, the wholesale price was mainly determined by macroeconomic factors and the demand of electricity, which meant it was relatively predictable and could be hedged cost effectively, to provide price certainty.

However, the introduction of renewables to replace oil, gas and nuclear power stations in the UK, has significantly increased the wholesale price volatility, due to supply margins dropping to less than 5% in the winter period and mismatch between the production of renewable electricity versus peak demand, which means the industry regularly see negative prices and/or prices that rise to 10-20 times the average price.

The latter means that hedging alone will not provide energy managers with the cost control needed to prevent escalating wholesale electricity costs, as managing when you use electricity and respond to the market, has become an important part of managing energy costs day-to-day.

The introduction of renewables and the associated costs, to fund the associated subsidies (e.g. Renewable Obligation, Feed-In-Tariff, Contracts for Difference) and costs associated with managing the intermittency (Capacity Market, BSUOS), has also meant that most of the unit costs of electricity are now determined by the non-commodity charges.

As it's difficult or expensive to 'hedge' these non-commodity costs in the traditional way and costs were rising in some cases 20% year on year,



businesses had a strong incentive to start investing in (renewable) generation and energy efficient equipment, to reduce the 'behind-the-meter' electricity consumption, to avoid these charges and reduce exposure to future increases.

How do you see the future of the industry developing?

Given the climate emergency, the future of the energy management industry will be heavily driven by reducing organisations' carbon footprint, whilst mitigating the potential cost impact. In many organisations, energy managers and their teams, will be assigned the responsibility to lead the decarbonisation of their organisation in a way that withstands customers' and other stakeholders' scrutiny.

A good understanding of carbon accounting and how low-carbon electricity & gas (biomethane, hydrogen) can be sourced, in a way it's demonstrating additionality, whilst providing value for the organisation is one of the key challenges that energy managers will face in the future.

> "A GOOD UNDERSTANDING OF CARBON ACCOUNTING AND HOW LOW-CARBON ELECTRICITY & GAS (BIOMETHANE, HYDROGEN) CAN BE SOURCED, IN A WAY IT'S DEMONSTRATING ADDITIONALITY, WHILST PROVIDING VALUE FOR THE ORGANISATION IS ONE OF THE KEY CHALLENGES THAT ENERGY MANAGERS WILL FACE IN THE FUTURE.

The historical issues with the Renewable Electricity Guarantees of Origin (REGOs) and other offsetting is affecting the credibility of the claimed carbon reduction. Combined with the rapidly increasing price of the REGOs and other carbon credits/offsets, following the climate emergency increasing the financially liability, means that energy managers need to develop their wider knowledge beyond the traditional commercial & technical skills & knowledge to ensure that Environmental, Social and Governance (ESG) criteria set by the organisation and strongly influenced by customers & stakeholders are met on an ongoing basis.

Author's profile:

Ben holds a Mechanical Engineering degree from Twente University and a chartership with the Institute of Mechanical Engineers. He started his career in 2002 at Corus/Tata Steel in the Netherlands and in 2014 joined Welsh Water. In 2018, he was appointed as the Head of Energy, leading on all aspects of energy and carbon management. Ben is the current Chairman of the EMA Board of Directors on which he has been serving for the past 2 years.

by Gillian Brown, Vice Chairperson of the EMA Board of Directors and Energy Manager at University of Glasgow

10 YEARS OF THE ema energy managers association

The evolution of bringing historically disparate disciplines together to create a whole collective effort in our carbon challenge has been revolutionary

How has the energy management industry evolved over the past 10 years?

I have been working in the energy management industry, specifically within the public sector, for 17 years. Whilst the public sector does not normally have the reputation of being able to move quickly and with the times, I have been lucky enough to be able to say that I have seen significant change throughout my years in the sector. When I started in this field, the role of the Energy Manager had very few similarities to the role I have today; bill validation, project works, reductions in consumption are all still the key building blocks any Energy Manager should excel at.

However, in the last few years, the changes to the language used when talking about energy and its associated emissions, the scope and scale of the tasks undertaken, the enhanced focus from both internal and external parties, and the evolution of bringing historically disparate disciplines together to create a whole collective effort in our carbon challenge has been revolutionary. As Energy Managers we have had to evolve and quickly.

The drivers of these changes have varied over my career, but their commonality is that they have all become much bigger and come much faster than when I first started in the field. The cost of energy has always been and will always be the main driver for change. 17 years ago, the word cost was simply the financial outlay for the energy purchased, and as that cost grew there was an ever increasing requirement to ensure efficiencies could be made to reduce that cost. 17 years on and the word cost means so much more. Yes, the financial impact of our energy is an increasing worry for many, the price hike we have all been exposed to over the last few months is testament to that, but in the current world the cost of our energy is so much more.

The reputational cost of the energy we consume and the associated carbon emissions can do as much damage to an organisation's reputation as it can to the financial bottom line.

By reducing the reliance on fossil fuels, increasing the amount of self-generation, consuming energy efficiently and effectively, builds an image to the outside world that an organisation takes its duty to the environment and the world seriously.

> THE REPUTATIONAL COST OF THE ENERGY WE CONSUME AND THE ASSOCIATED CARBON EMISSIONS CAN DO AS MUCH DAMAGE TO AN ORGANISATION'S REPUTATION AS IT CAN TO THE FINANCIAL BOTTOM LINE.

This can be the difference between winning or loosing a contract, increasing student recruitment numbers or getting buy in from an external investor. If this reputational cost is ignored it may cost an organisation more than simply an extra few pence per kwh.

How do you see the future of the industry developing?

COP26 in Glasgow provided a glimmer of hope for the planet, whilst at the same time creating a tsunami of enthusiastic people, innovative technical solutions and a global shift in peoples' willingness to act. I believe that this is the beginning of a bright and prosperous future for our industry. The future must bring change, and this must be bigger and more impactful than we have ever experienced before. Projects have to be bigger, decisions must be bolder and more people from different sectors need to be involved. Most importantly we all must work together, this must be internal to our organisations, as collectives of similar industries, at a national scale and at an international scale. If my 17 years in the industry has taught me anything it is that change is inevitable, but the direction and speed of that change is up to us.

Author's Profile:

Gillian is a long standing energy management professional. She has expertise in the management of energy and carbon emissions from buildings of all ages ranging from small scale domestic properties to large scale hospital complexes. As well as managing the energy and carbon emissions for the 4th oldest English speaking university in the world, Gillian researches the development of digital twinning technology for the development of large scale energy reductions at building group level. Gillian is the Vice Chairperson of the Energy Managers Association Board of Directors and Chairperson of the Empowering Women in Energy Management and Environment Group.

by Caroline Holman, Member of the EMA Board of Directors and Head of Energy at South Staffs Water

10 YEARS OF THE ema energy managers association

The three underlying principles of energy security, cost optimisation and decarbonisation still hold true

When asked to reflect on how the energy management industry has evolved over the past 10 years; I cast my mind back to the main events which I recall in 2012. This included DECC's Electricity Market Reform (EMR) which was intended to drive the changes needed to underpin three key objectives, namely - keep the lights on, keep energy bills affordable (?!), and to decarbonise energy generation.

In 2016, Business, Energy & Industrial Strategy (BEIS) replaced the Department for Business, Innovation and Skills (BIS) and the Department of Energy and Climate Change (DECC). While it would be disingenuous in a complex, global interconnected market to suggest that current energy wholesale market challenges can be laid at the door of EMR, or the plethora of 'not so connected' energy regulations since, there is an irony here somewhere! However, the three underlying principles of energy security, cost optimisation and decarbonisation still hold true, and are the foundations of robust energy management and good practice.

So what have been, in my view the key drivers for change which have influenced the energy management sector over the last 10 years?

For me personally, the requirements of the role have increased significantly in terms of skills – it is no longer just about consumption and cost, but a far broader 'total resource' efficiency leadership position. This in turn has, I believe increased the attractiveness of the role; and I certainly see and experience far greater diversity in my sector and professional sphere. This is extremely important as such a challenging but highly rewarding position needs to attract the very best talent from across all industries, sectors and communities.

When I first started out in energy management, carbon was already a key part of the role, however over the last 10 years a number of other critical areas have emerged including, but not limited to risk management, resilience, PR, psychology, commodity trading, SMART systems (data and metering), and of course technology across the low carbon and renewable energy spectrum.

The level of acronyms has also increased exponentially, and some have been used more than once – I always thought BMS was a building management system, now I see it regularly referred to in battery management! No surprise then that my biggest daily challenge is sifting through the jargon and veneers or 'green washing' and trying to engage stakeholders in a meaningful, and mutually beneficial way.

So, how do I see the future of the energy management industry developing?

In broader terms, I expect and hope for greater focus on Whole Systems Thinking around total

resource efficiency i.e. talent, skills, consumption, carbon, cash, natural capital, technology, communities, sectors and policy. This should be ably supported by established and emerging technologies, Artificial Intelligence (AI), smart systems and analytics.

> THE REQUIREMENTS OF THE ROLE HAVE INCREASED SIGNIFICANTLY IN TERMS OF SKILLS – IT IS NO LONGER JUST ABOUT CONSUMPTION AND COST, BUT A FAR BROADER 'TOTAL RESOURCE' EFFICIENCY LEADERSHIP POSITION.

However, without collaboration and a whole systems approach, the benefits will be undermined and 'unintended consequences' may well distract efforts away from understanding and addressing the broader climate and environmental objectives. We need to embrace the role of new technologies and advanced modelling and analytics to secure new levels of intelligence, while aligning comprehensive environmental stewardship with delivery of efficiency objectives.

Energy Managers must continue to pursue greater transparency, accountability and responsibility - engagement versus 'expert view'. We must bring on board advocates across all sectors including communities - remove jargon, smoke and mirrors and be honest and up front. A robust and agreed plan which all stakeholders understand and support, delivering 80% progress, is better than 100% ambition with no plan or advocacy to get there!

There must be focus and attention on reducing the gap between home and work – awareness of consumption, personal responsibility, etc. Which begs the question - Will the many positive lessons from the pandemic be truly evaluated and applied where appropriate?

As I reflect on the last ten years and the role of the EMA in continuing to uphold high levels of professional conduct, development, standards and the real word application of sound energy management principles, I continue to circle back to 'my' two universal truths:

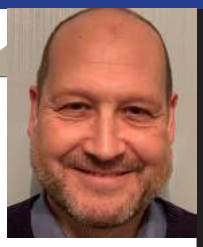
1. Measure to understand, prioritise and action…

2. Good energy management is about the whole system and the interdependencies across People; Process; Environment; Carbon and Cost. Focus on one or two elements in isolation at your peril!

Author's Profile:

Caroline is a Chartered Environmentalist with the Institute of Environmental Managers & Assessors (IEMA), Fellow of the Institute of Engineering Technology (IET), and Board member of the Energy Managers Association (EMA). She has over 30 years' experience, predominantly in the automotive sector. Her various roles have included engineering, manufacturing, supply chain, sustainability & CSR, project management, energy strategy & policy, carbon, and utilities risk management.

by Martin Gannon, Member of the EMA Board of Directors and Energy Optimisation Manager at Liberty Speciality Steels



The drivers for energy efficiency in the steel industry were rising energy costs, price disparity and government policy

How has the energy management industry evolved over the past 10 years and what were the drivers for change?

I have spent the past forty years working in the Steel Industry in various engineering roles across production areas, primary melting, rolling / finishing and service departments including, high voltage, electrical services / workshops, and project development. I moved into an energy management role in 2010, the role has certainly changed and evolved over the past twelve years.

Looking back at the early days, the drivers for energy efficiency in the Steel Industry were rising energy costs and price disparity, with Government policy in the form of Steel Sector Climate Change Agreements and participation in the EU Emissions Trading Scheme also driving change.

As technology quickly developed and became more affordable, 'the low hanging fruit' of LED lighting schemes and controls, Variable Speed Drives and high efficiency motors, pumps drives and fans, compressed air systems, leaks, efficiency, hydraulic systems and controls were adopted along with new metering, monitoring and targeting systems. The improvements and savings drove interest and ownership from plant and managers helping to drive behavioural change.

> THE IMPROVEMENTS AND SAVINGS DROVE INTEREST AND OWNERSHIP FROM PLANT AND MANAGERS HELPING TO DRIVE BEHAVIOURAL CHANGE.

Within my Industry, the Energy Manager's role moved under the environmental function, as an Energy Intensive Industry, we work closely with Make UK / UK Steel and the Energy Intensive Users Group to lobby Government on energy pricing and policy. We secured the EII compensation scheme and the additional reporting requirements this brought.

With the drivers of energy price and continuing Government Policy changes, reporting began to play an ever-increasing role for the Energy

Manager, with EUETS (now UK ETS) and Greenhouse Gas reporting requirements along with the mandatory external audit and verification of data.

The Phase 1 ESOS audit requirement and other subsequent phases have helped to drive the Energy Manager and energy from plant room into the board room and put energy costs and efficiency at the forefront of business decisions with the reports and recommendations being presented and signed off at Board level.

The Streamlined Energy and Carbon Reporting requirements brought in two years ago has also strengthened the role of the Energy Manager in the Board room with the requirement for disclosure of the site energy, fuel consumption and carbon intensity in the annual business accounts.

With the increased awareness of 'climate change' and 'carbon', customers started to ask about the Energy Intensity and carbon associated with the product, this has led to production of EPDs and LCAs for products and process routes and the certification and ongoing assessment to different 'sustainability standards', UK CARES and BES6001. Over the years, advantage has been taken of any available Government schemes, EDR (Electricity Demand Reduction), IHRS (Industrial Heat Recovery Support programme), TFI (Transforming Foundation Industries - UKRI). These schemes have helped to part fund installation and the proving of new technologies, requiring the Energy Manager to adapt and learn new skills in the complexities of applying for the funding and the management of the schemes with their complex reporting requirements.

How do you see the future of the industry developing?

The drivers of change have been continually evolving, with energy price and Government policy still significant, the emergence of climate change and COP commitments are now business issues focussing the drive for carbon neutrality and sustainability. This driver has rapidly changed the focus of business strategy and the role of the Energy Manager, businesses are now faced with the challenge of carving a path to carbon neutrality or net zero with the Energy Manager playing a pivotal role in setting out the pathway.

The energy management industry continues to undergo rapid change, with the energy grid mix being driven by the net zero and carbon neutrality targets, non-fossil fuel technologies are being developed to meet the challenges of industrial and domestic heat decarbonisation with Hydrogen beginning to play a role along with Carbon Capture, Usage and Storage (CCUS) and other emerging technologies. The future certainly looks challenging for the modern Energy Manager as we strive for carbon neutrality and net zero.

Author's Profile:

Martin has worked in the Steel Industry for over 40 years, he is a Dynamic Chartered Engineering Manager with extensive maintenance, project management, process innovation and team building skills. He is a Member of the IET and became a Chartered Engineer in 2000, he is a registered IET Mentor, supporting and coaching young engineers and apprentices. He is a Lead ESOS Assessor, a Fellow of the Energy Managers Association and has been a Board Member for the past two years.

10 YEARS OF THE EMA

ema
energy managers association

2012

THE ENERGY MANAGERS ASSOCIATION (EMA) IS ESTABLISHED

2013

FIRST PRACTICAL GUIDES ARE DEVELOPED

EMA ENERGY MANAGEMENT AWARDS LAUNCHED

JUNIOR ENERGY MANAGER APPRENTICESHIP STANDARD APPROVED

2014

APPROVED AS AN ESOS LEAD ASSESSOR REGISTER

EMA CORPORATE PARTNERSHIPS LAUNCHED

NAMED AS THE NATIONAL ADMINISTRATOR FOR THE EUROPEAN CODE OF CONDUCT FOR ENERGY PERFORMANCE CONTRACTING

2015

EMA RECOGNISED ENERGY MANAGER STATUS LAUNCHED

THE EMA MAGAZINE LAUNCHED

2016

LEC ENERGY MANAGEMENT TRAINING PROGRAMME LAUNCHED

EMPOWERING WOMEN IN ENERGY MANAGEMENT AND ENVIRONMENT GROUP LAUNCHED

2017

TAILORED IN-HOUSE TRAINING LAUNCHED

2018

TAILORED IN-HOUSE TRAINING ABROAD LAUNCHED

2019

KNOWLEDGE PARTNERSHIP LAUNCHED

2020

ONLINE PROFESSIONAL DEVELOPMENT LAUNCHED

2021

STEERING GROUP LAUNCHED

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ENERGY MANAGEMENT PROFESSION – 10 YEARS AND COUNTING

Mike Pedley, Vassia Paloumbi, Robert Williams, Nicky Maclaurin, Kit Oung and Roger Low reflect on the energy management profession and career

by Mike Pedley, Commercial Director at Easy Hydro

The key is to focus on what people are actually achieving and continue to learn from each other

What made you to choose a career in energy management?

I didn't set out for a career in energy management. Indeed, I only came to it by accident....

Growing up in the 1970s, ideas of climate change, environmental damage and renewable energy were very new, seen as the domain of academics and "hippies". As a teenager I was taken to visit the then recently established Centre for Alternative Technology and, though now it is quite different, I still find it an inspirational place today. Studying geography at university, I worked both with maps and satellite images to study a variety of environmental effects (producing a mid1980's versions of the combined digital map+satellite overlays that we now take for granted in many apps).

Jobs in that field were hard to find and I ended up in the water industry, initially on Geographic Information System and then on a variety of other roles in an industry that plays a big part in looking after our environment (& occasionally doesn't!). One role was to work on a commercial bid to operate part of another water company and it became very clear that one of the biggest risks and opportunities for water operations was energy. After winning the bid, my role became commercial manager and increasingly focused on energy, establishing a small, dedicated energy team. Even then, as a small team, it was initially a struggle to gain a wider view of energy management, to discover what others were doing and where we could learn from them.

From 2010, I led a team which brought together all aspects of energy management, combining capital investment into renewable generation with energy purchasing and energy efficiency. Over the next eight years with that holistic approach, we facilitated a huge step change in the company's renewable generation, energy efficiency, purchasing strategy and carbon reduction. I was well and truly an energy management professional!

How has the profession evolved/ changed over your years in the industry?

In the 1980s looking at possible careers, energy management had little or no profile or recognition. Even by the early 2000s when I finally entered the field it seemed to me that it was developing in isolated pockets and with a very strong technical or engineering bias. Companies were now employing the occasional energy efficiency specialist, but those people were isolated from finance or procurement professionals who often bought the energy yet maybe had only a limited understanding of what they were buying.

Cross-sector groups, such as one established under Water UK, began to bring energy professionals together and gradually we saw more people, such as myself, coming in from less technical backgrounds. Increasingly organisations emerged that worked across sectors bringing together a wide range of professionals. These bodies crucially combined technical, commercial and, particularly in the case of the EMA, strategic policy and governmental perspectives.

Energy management professionals now have more resources, and more contacts, than ever to help them develop their solutions to whatever energy challenges they face.

> "ENERGY MANAGEMENT PROFESSIONALS NOW HAVE MORE RESOURCES, AND MORE CONTACTS, THAN EVER TO HELP THEM DEVELOP THEIR SOLUTIONS TO WHATEVER ENERGY CHALLENGES THEY FACE.

How do you see the profession developing in the future?

It would be good to think that being an "energy professional" would become just as recognised as being an "accountant" or "engineer". I just hope it doesn't get bogged down in bureaucracy of certifications and charters. The key is to focus on what people are actually achieving and continue to learn from each other.

The biggest change will, hopefully, be one of growth with more people and new disciplines becoming evident. As we grapple with the energy transition to a green future whilst maintaining a technically and economically balanced supply there will be new opportunities for energy professionals. Integrating generation, storage and consumption both on a macro and micro scale is a huge and exciting challenge.

What advice would you give to someone just starting in the profession?

Stay "head-up" i.e. look around you at all aspects of energy management and other sectors to the application you are in. There is usually more than one way of solving the same problem e.g. use less energy, generate more or buy it cheaper can all produce the same results. Similarly other businesses will probably have solved similar problems or are developing new opportunities so stay in touch through groups such as EMA, find those gem ideas, adapt them to your own application and then share your success to keep the momentum going.

Wherever possible try to see things from the viewpoint of your customers i.e. usually other employees within your company. Spend time looking at what they do and how they use energy, not just try and find a solution for a problem which they or you perceive. Remember energy is a means to an end and not (usually) an end in itself!

> "REMEMBER ENERGY IS A MEANS TO AN END AND NOT (USUALLY) AN END IN ITSELF!

Author's Profile:

Mike has extensive commercial and energy experience in the water industry. He was Head of Energy with Welsh Water from 2010-2018 and is now Commercial Director with Easy Hydro bringing simple, low cost, hydro-power solutions to a wide variety of applications. He served as a board member of the EMA in 2017-2019.

by Dr.Vassia Paloumbi, Operational Environmental Sustainability Expert at Lantern Environmental Consulting and Turner & Townsend

10 YEARS OF THE ema energy managers association

The titles have changed over the years even if the challenges and the day-to-day responsibilities of the job are consistent across the sectors

What made you to choose a career in energy management?

I did not really choose a career in energy management; I can say it chose me. I started volunteering for an environmental NGO during the final year in my PhD as I needed to do something else and lacked motivation to finish it.

Due to my volunteering experience in the sector my first job, having completed my studies, was Environmental Business Advisor for SMEs. Soon afterwards I moved to the London Borough of Hammersmith and Fulham as their first Carbon Reduction Manager taking over their outgoing energy manager.

The role therefore came with a lot of energy management requirements and I was also responsible for the council's newly adopted carbon reduction plan. I have therefore mostly trained on the job and directly from my colleagues in the organisations I worked for as well as through networks with my counterparts in the other local authorities and the public sector.

I particularly found useful the London Energy Project, London Boroughs Energy Managers group as well as similar networks in the Arts & Museums sector when I was Tate's Environmental Manager.

I was introduced to the EMA around 2014 and also found it a very useful network for people with a vast of energy management expertise and experience as well as wider backgrounds, knowledge, who are happy to share and work together.

How has the profession evolved/ changed over your years in the industry?

I don't think I ever followed what energy management used to be, but I understand the profession in the last 10 years has certainly been 'diluted' with wider sustainability and climate change requirements.

As an energy manager, quite often, you are asked to do everything in the organisation under the environmental/ sustainability agenda even in some cases CSR agenda, including reporting, compliance, procurement, communications and green champions.

Additionally, the titles have also changed over the years even if the challenges and the day-to-day responsibilities of the job in my opinion are consistent across the sectors. The current trend is Net Zero Manager for example where previously environment, sustainability, climate change and carbon were part of the common job titles.

How do you see the profession developing in the future?

Over the last year, I have seen a massive spike in jobs advertised as net zero and climate change has been taking over the news. Awareness of stakeholders, engagement of customers has changed a lot so quite a few large companies want to be shown to do well in this space and against their competitors.

The new generation of buyers, users and employees are more 'switched on' to issues about climate change and climate emergency. I think in the next couple of years a lot of emphasis will be given on 'carbon' all in the name of carbon neutrality and net zero.

However, as energy managers and sustainability professionals we need to do the right thing and ensure that our clients or organisations know that offsetting, or for example just moving to green tariffs is not the way to reduce carbon. Decarbonisation means reducing your energy use first and foremost and improving your buildings and operations in a sustainable manner.

What advice would you give to someone just starting in the profession?

I entered this career path 'accidentally' in a way by volunteering for a while for an environmental NGO. This could be one way to gain practical experience. Other than that, for those who live in London we are fortunate enough to have a number of free conferences and events. However, there is a lot of online resources available as well which can now be accessed from anywhere.

The Energy Managers Association is a great network of like-minded people and people who will be happy to chat and share their experience in the sector. So do reach out if you see someone you would like to talk to.

Through the EMA one can also upskill easily as there is a diverse range of training courses for different levels from compliance to technical ones ranging from energy management to climate emergency topics.

Author's Profile:

Vassia is an experienced sustainability and energy management professional with over 15 years' experience. She has worked across the public and private sector in delivering and leading sustainability and environmental programmes for organisations with large and complicated building portfolios. Vassia understands and is able to address the challenges and opportunities organisations face in addressing sustainability in an operational build environment. Vassia served as a board member of the EMA in 2018-2019.

EMA ONLINE WORKSHOPS

Keep well informed about the most common energy management practices, share useful tips and stay connected.

UPCOMING WORKSHOPS:

9 March 2022 - THE ANALYSIS OF HALF HOURLY DATA

16 March 2022 - DECARBONISATION OF HEAT - THE BASICS OF HEAT PUMPS

30 March 2022 - CALCULATING CARBON FOOTPRINT - SCOPES 1,2 & 3

Register at: https://www.theema.org.uk/ema-online-workshops/

by Robert Williams, Director – Procurement Sustainability at AstraZeneca

A personal focus on life-long learning is really important, both technical energy industry knowledge and developing softer skills that go beyond energy

What made you to choose a career in energy management?

My career has been a journey downstream from primary energy production, actually from the coal face, through renewable energy project development and electricity generation, to energy management and energy procurement and now, sustainability.

A focus on eliminating waste, and on doing more with less has been a thread running through all of these career steps. Being from Yorkshire, perhaps that comes naturally. Running more processes on less power, using less resources, forecasting outputs and requirements; these are all commercial issues which are core to any business.

The foundations of energy management are about controlling consumption, controlling costs, improving efficiency, and over the last 10 or so years also reducing carbon emissions. When I started managing energy for a very large electricity consumer, energy was becoming an important business issue, driven by rising costs. The commercial aspects of energy management were just as important as the technical engineering aspects.

How has the profession evolved over your years in the industry?

Managing energy now entails so much more than thinking about MWh. Energy Managers now need to think about £GBP, MWh and tCO_2e.

The focus was historically on total annual energy consumption. Now it is important to consider time of day charges and demand profiles, commodity costs, carbon costs, non-commodity costs; planning how to manage cost, not just manage consumption. Energy management is also now about forecasting MWh and forecasting cost, sometimes years in advance as part of supporting an organisation's Medium Term Plans.

With this increasing complexity, and cost of energy to all consumers, the profile of an Energy Manager has moved from the back office to the Board room. Through geopolitical and cost challenges, energy is now in the headlines almost weekly, becoming a high profile issue in media and politics, which supports the higher profile of Energy Managers.

Energy now needs an integrated strategy, spanning right across an organisation, to deliver maximum benefits from all facets of what is now in the remit of an Energy Manager. That means working right across an organisation, with the engineering teams and also with the finance team, sustainability team, procurement team even external comms team to publicise the great work done by Energy Managers to meet global challenges.

So an Energy Manager in the 2020s needs to be able to communicate in the language of Finance and Sustainability, as well as Engineering.

How do you see the profession developing in the future?

As the 4th industrial revolution progresses with an ever more connected world, we rely ever more on always-on technology that touches almost all parts of an organisation's operations. But the fundamental energy trilemma of affordability,

sustainability and security of supply will continue to apply. And all three aspects will grow in importance relative to the rest of an organisation's priorities and risks. Failure to address any one of these aspects could now materially impact the reputation of an organisation with customers, investors and employees.

This is making senior Energy Managers part of an enterprises leadership team. Energy Managers are now contributing to organisations' financial planning. And to plans to meet SDG 7, 12 and 13 in this critical decade of delivery for global sustainable development goals. Energy Managers are also developing new metrics to communicate business impact. These are broader than PUE for datacentres, such as energy productivity metrics within product life cycle assessments, which will be needed to inform action plans to meet future Net Zero science-based targets.

I've worked with brilliant teams of energy specialists who were always innovating (and procurement teams doing the same) and all industry sectors continue to need energy innovation. Whether incremental improvement steps or new cross-sector combinations of ideas coming together, innovation is the future of energy management – using renewable energy, distributed generation, carbon reduction, cost control, uninterruptable power, digital twins, remote monitoring, technology and energy are coming closer allowing real time visibility and critically, action (remember once per month manual meter reads?).

What advice would you give to someone just starting out in the profession?

To succeed in any profession, get involved, be passionate about your subject, join membership organisations and attend conferences, even virtually, to build your personal networks to find those new ideas from other sectors to bring into energy management. Being passive is not an option; success will not find you. And try to work for organisations that demonstrate best practice, especially early in your career (later, with more experience, you can challenge to raise standards).

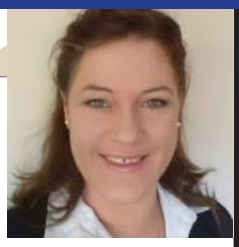
Experts in the future of work predict that the children of today will have perhaps 10 or more different jobs, many of which haven't even been invented yet. In this fast-moving world we all need to master the art of personal re-invention. A personal focus on life-long learning is really important, both technical energy industry knowledge and developing softer skills that go beyond energy.

There is a world of opportunity for those Energy Managers who can question the status quo and think beyond the boundaries that organisations and even societies put on themselves today.

Author's Profile:

Rob has worked across the energy sector for over 20 years, from electricity generation to energy management and procurement for large energy consumers. Rob was previously a Board member of the EMA and is now Director of Procurement Sustainability for AstraZeneca and an Advisory Board member of Durham University's Energy Institute.

by Nicky Maclaurin, Director at Maclaurin Energy Consulting



The role of the energy manager has become more prominent, and energy considerations are continuing to feature in board level decisions

What made you to choose a career in energy management?

In 2005, I crossed paths with the Energy Management world whilst on a temporary work placement. Having come from a Food & Beverage background in South African Game Reserves, this was certainly a big change. Energy Management was not an industry I expected would hold much interest, however something clicked immediately and it turned into a fast moving career change and passion for me.

I quickly observed significant complexities in industry charging structures and processes, and very little transparency when it comes to end users. With an ability to make sense of these complicated areas, I found my place in helping decipher costs, achieve savings and take control of their energy expenditure. Over the years, my interests widened into many other areas of energy cost management, renewable energy projects and energy management systems.

How has the profession evolved/ changed over your years in the industry?

There has certainly been a significant shift over the years towards sustainability, and as a result a growing new industry. However, complexities and red tape continue to hinder some progress in these areas.

The movement towards Electricity Market Reform and Net Zero has not come without significant cost to the end user. With additional environmental charges being passed on through energy bills, coupled with the cost of implementing energy management systems and meeting new industry requirements, businesses have definitely felt the pinch.

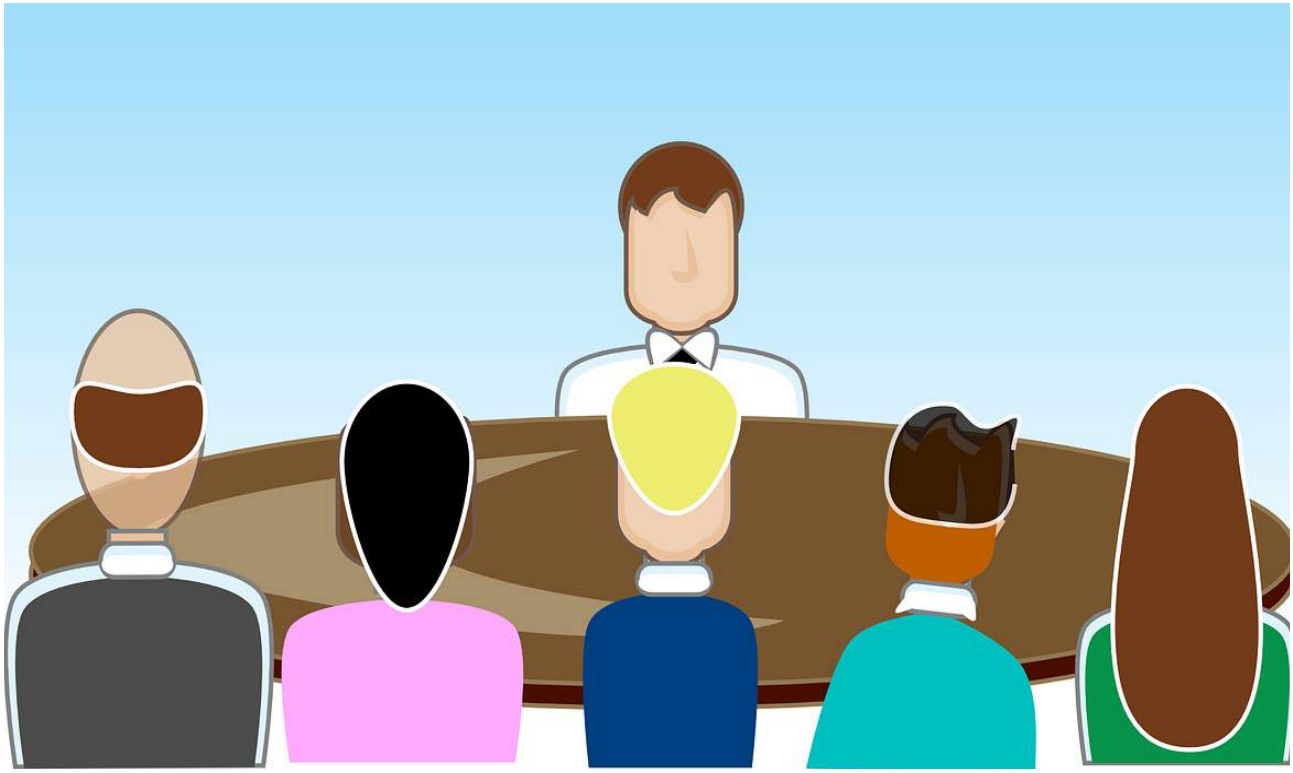
Equally for generators, returns from renewable generation has shifted. What was once a more certain investment with stable income from schemes such as the Renewable Obligation and the Feed in Tariff, these are being replaced with more index-based income, increasing uncertainty and investor caution in uptake.

In light of climate change, it is obvious that a significant reform is needed, but some mechanisms in achieving this are clearly contentious and dissuade investment.

What has sadly not seen very much progress over the years, is a clamping down on rogue energy brokers. Ofgem's TPI code of practice has been shelved and although many suppliers have implemented their own codes of practice, poor behaviour is still rife. This coupled with exposure to the current extreme wholesale market prices, has left some end users with significant financial pressures.

> "WHAT HAS SADLY NOT SEEN VERY MUCH PROGRESS OVER THE YEARS, IS A CLAMPING DOWN ON ROGUE ENERGY BROKERS. OFGEM'S TPI CODE OF PRACTICE HAS BEEN SHELVED AND ALTHOUGH MANY SUPPLIERS HAVE IMPLEMENTED THEIR OWN CODES OF PRACTICE, POOR BEHAVIOUR IS STILL RIFE.

Another area that has not evolved much over the years is transparency in supplier billing. Even pass-through contracts with "full visibility" still hold some hidden and vague calculations. Public information in these areas is often not available or sufficient



enough for the end user to validate or make sense of these charges, and often one is left to throw in the towel when it comes to the black hole of supplier billing.

A major industry change ahead is Ofgem's Significant Code Review, and more specifically their Targeted Charging Review. This will result in a complete overhaul of industry charging moving away from time-based consumption charges towards more fixed costs. It will be an interesting area to look out for in terms of grid balancing and possible opportunities for generators and end users to support National Grid, when the incentive to manage energy around peak times diminishes.

How do you see the profession developing in the future?

With ever increasing energy costs, and the critical need to tackle climate change, onsite energy management has never been more important. It is hoped that the energy management industry remains a healthy and supported one that grows from strength to strength, however an overhaul of key policies is needed to truly optimise incentives and growth in this area.

Certainly, the role of the energy manager has become more prominent, and energy considerations are continuing to feature in board level decisions. Energy managers are the critical foundation needed to deliver the change required and this role will continue to become increasingly significant and pioneering in leading the UK to deliver their climate change objectives.

What advice would you give to someone just starting in the profession?

The most important advice I could give to anyone joining the energy management industry is to gain experience in as many different areas of energy as possible before specialising. In addition, working for employers on opposite spectrums (such as supply chain and also the end user), significantly broadens one's holistic understanding of the industry.

It is also important to remain informed by attending events, taking part in CPD and webinars as well as being a part of local energy groups and associations such as the EMA. Collaboration and information sharing with peers enriches knowledge and strengthens our ability to achieve our shared objective in UK carbon reduction and Energy Management change.

Author's Profile

Since transitioning into the industry in 2005, Nicky has worked in varied areas of Energy Consulting with SMS PLC, as Energy Manager for Vodafone, Associate Director in Energy for Savills, as well as operated her own energy consultancy since 2017. Having gained experience in energy project management, ISO system implementation, electrical connection works, she also specialises in energy procurement and cost management as well as recoveries relating to complex energy billing. Nicky served as a Board Member of the EMA in 2016-2019.

by Kit Oung, Principal Consultant at Efficien:ology

Be cautious as not to become myopic in focusing on purely the technical, managerial, or leadership efforts – moving all three is equally important

I grew up in the tropics where there is effectively a dry season and the wet season. When I was young, 25-27°C was the norm. Days over 30°C were rare, and fresh breeze and regular rain cooled down living spaces. Between the 1980s and mid-1990s, construction projects and new industries sprouted everywhere. There appeared to be nothing stopping the tiger economy and large-scale deforestation, urbanisation, and industrialisation take off.

As the average temperature increased by 10°C, 35-37°C and less rain became the norm. The dry season became synonymous with prolonged heat and smog, particularly in the city. By the late 1990s, the tiger boom had its balloon popped. Companies were shutting everywhere, and the regional economies were spiralling out of control. Energy efficiency is one of the items that companies do to minimise cash drain and stabilise their financial losses. It is one of the easiest costs to control and the financial situation necessitated the need for it.

Over the years, the concept of energy management has had many rebranding – from energy conservation, energy savings, energy efficiency, energy management to CO_2 emissions, carbon-neutral, and net-zero. Industry 4.0 made access to energy information easier. New technology is superseding older ones fast. They are also cheaper to buy and implement.

When I graduated from university, I thought that I knew everything there is to know and that all my engineering skills are all I needed to save energy and prevent environmental pollution. What became very clear is that I was constantly fighting "management" – be it as a self-assured consulting engineer or as a production engineer – convincing management is rather difficult. The reasons given appear to be a moving feast of "yes, but …" or outright "no".

As my career progressed into management, I was constantly bombarded by my team with ideas that are often seemingly sensible but are often poorly conceived or have flaws in them that need ironing out. To be fair, it reminded me of … me! At the same time, I had to juggle multiple company priorities, which at many times, meant that trade-offs were needed as there was only one of me and 24 hours in a day. More often than not, butter was spread so thinly, it was amazing that anything could get done.

In the early-2010s, having spent several short periods in two of the best business schools in the world and sat on 3 boardrooms, I experienced first-hand what are the issues leaders faced. The cutting edge of an organisation, its strategy, its management, and the consequences of its decisions – the good and the bad – and how it trickles through the whole organisation.

The levels of leadership, management, and engineering varies in companies and frequently are lacking in one or more components, making energy management work difficult. I have had the fortune to observe energy management in many countries. Some, particularly in Asia and the Middle East, place heavy emphasis on technical ability. Those in the English-speaking countries overemphasise the role of leadership and a habit of throwing money at a problem expecting it to materialise. In Continental Europe and Latin America, energy management is synonymous with management drive. Yet, not one region is particularly successful

compared to the potential savings available.

In my experience, the tools and techniques for energy management are the same. The analytical methods are also the same. The presence of ALL three is the predictor of success. Creating and improving all components is essential.

> IN MY EXPERIENCE, THE TOOLS AND TECHNIQUES FOR ENERGY MANAGEMENT ARE THE SAME. THE ANALYTICAL METHODS ARE ALSO THE SAME. THE PRESENCE OF ALL THREE IS THE PREDICTOR OF SUCCESS. CREATING AND IMPROVING ALL COMPONENTS IS ESSENTIAL.

I also believe the practice of optimising one resource, e.g. energy-only or water-only, is numbered. Optimising the whole plant or whole building gives larger savings as compared to single-resource initiatives. Energy, water, raw materials, and waste are just some of the resources that can be optimised simultaneously. The bigger saving also captures the attention of leaders and managers much easier than the old approach.

Advanced and mature companies are also moving towards a closed-loop economy where all waste can be recycled, reused, remanufactured, or repurposed by others. I see this emergence as a continuum of a company's maturity: from those that are laggers having a reactive approach, the single-resource approach, the multiple-resource approach, and the proactive closed-loop approach.

This is a fantastic time to make an effective stand for energy and climate change. There are many different entry points for professionals to come into the sector. Your efforts will result in larger savings and you will see the efforts turned into fruition much faster. It helps to avert climate pressures and achieve sustainable development goals. There are also more opportunities to develop your skills compared to what was available before. When you are competent in one resource, you can develop your competence in other resources.

Do be cautious as not to become myopic in focusing on purely the technical, managerial, or leadership efforts. Moving all three is equally important – be it in a company or a nation. Also, do make it a habit to enjoy what you do. As the saying goes, "If you enjoy doing your work, you will never have to work a day in your life!"

Author's Profile:

Kit is a Principal Consultant, coach, and author of People, Planet, Profits (BEP, New York). He has 25 years of hands-on experience working with premiership football clubs, luxury retail, luxury hotels, F&B, hospitals, industrial, governmental, and non-governmental organisations across five continents. Kit also trains professionals in good Environmental, Social, and Governance (ESG). Previously, he served on EMA's Board of Directors for four years – two as an ordinary member and two as a Vice-Chair.

by Roger Low, Consultant Energy Manager at Speedwell Energy Services

The accidental energy manager – part 2

The title of this article is deliberate, as originally, I was trained as a Naval Architect, completing my education just in time to see the ship building industry in the UK collapse. I am not going to go through my entire career, as most of it is irrelevant to energy management and also boring. Apart from that, I have already written an article on my career for this magazine five years ago, so I will take it from where that left off.

I had various jobs, but my first serious career post was in the MoD Civil Service as a transport manager, running a large lease fleet of vehicles. Though the job was interesting and to a certain extent fun (actually, to be honest, really fun - I got to play around with many vehicles), there was little or no chance of promotion as the local conditions made things effectively "dead man's boots". There were even several staff locally, who had been there thirty plus years and still waiting for progression. So, I took the decision to transfer to estates management which had a bigger turn-over of staff.

This turned out to be the single best move I ever made in my career as the senior boss actively encouraged staff to take external learning and use continuous professional development. It was during this time that the post of Brigade Energy Manager became vacant and as I had been dealing with LPG installations (I was the only one in the Brigade familiar with this, also turned out later, I was the only one familiar in the entire MoD) I got the job even though I wasn't looking for it. As I mentioned above, the accidental energy manager!

I undertook training in the subject, via both Civil Service training and external commercial courses, even to the extent of university courses at Leeds. I also attended quite a lot of industry exhibitions and conferences at my manager's suggestion to familiarise myself with the industry and methodology used, such as the black art of degree days and cusum.

When the MoD had one of its periodic change arounds, I found myself being given the Divisional Energy Manager's post (no promotion, just extra responsibilities) covering the entire Midlands and Wales. I had the budget for purchasing energy for the sites and with the management's permission I used some of this to carry out energy efficiency work and renewable projects, such as hydroelectric and solar generation. I persuaded the MoD to take up membership of the Major Energy Users Council (MEUC), which allowed me to have contact with Government and Parliamentary Groups giving me early access to various legislation and regulations prior to release, and to even participate in their development.

I had joined the Energy Institute during this time, as a full member (MEI), and began to take an interest in other trade and career bodies, taking further training and later attaining Chartered Energy Manager status. It was during this time that I encountered Rupert Redesdale of the EMA and I joined the association

as a Fellow. We had a similar view on career training as I had just introduced a Divisional Energy Warden's course (sometimes referred to as energy champions) and was running an energy efficiency drive in the Division. Later on, I even joined the EMA Board of Directors and took up the post of vice-chair for a two-year stint where we worked on developing the Junior Energy Managers Apprenticeship standard and several other initiatives, some successful and some not so.

I found the ins and outs of running a professional body interesting, especially trying to fit it in amongst my job duties. This is where we left off in the last article five years ago, things have changed a bit.

I have left the MoD on illness grounds – I was sick of them!

I am now self-employed, not an easy option, but I like the independence and being my own boss. It is a route that I would recommend but don't rush into it until you have looked at the issues involved. I run my own little operation which specifically helps community groups and churches in energy efficiency and renewables. It is a niche market, I admit, but an especially pleasing one as you help groups that genuinely need it and are grateful for your efforts. I will be the first to admit it is not the most profitable market but I don't have to faff around with ESOS, 50001 or any other accreditation route – deep joy.

I am also involved with another community interest company which aims to expand on my work to a greater level, both regionally and with other religious groups coming under our remit for help. Of course, Covid has had an impact with funding being redirected to helping those affected by lockdown as is only right. This has meant that until recently our work has slowed down temporarily but it is now picking up and our present project is to provide energy project advice to community centres in a local government area, and several churches.

Another area of focus is what help can we give when the domestic energy price rises kick off in April following the review of the price cap. This is going to have a significant impact on domestic consumers, irrespective of any help the government provides and the social impact is going to be dire as we have already seen with the removal of the universal credit uplift.

In fact, I would implore any fellow energy managers to offer their free assistance to local community groups to try and alleviate the social and financial car-crash that is coming.

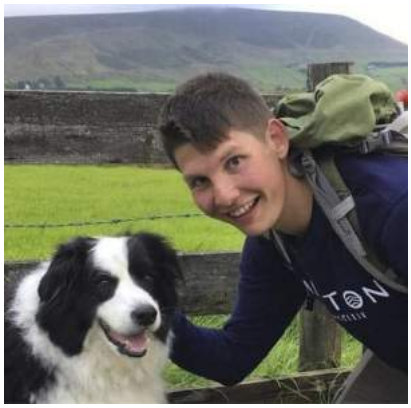
What is the future for energy management, and my role in it? – I don't know but whatever it is, it is my decision and my choice.

by Jack Beckwith, Rachel Feeney and Cai Hayes

New Talents Entering the Industry

Throughout this anniversary issue of The EMA Magazine, we have asked the leaders in the industry about their career journeys but we are not forgetting the new entrants and their experiences and hopes for the future.

Jack Beckwith, Environmental Officer at believe housing



What made you choose a career in energy management?

I have worked in housing associations for around three years, and about two years of that has been in energy and environmental roles.

Before that, I was fresh out of university after studying a biology degree and wanted to do something environmental. It sounds silly now, but I'd never even thought that there were jobs in either energy or housing! I knew it happened, but never thought of the people and roles behind the scenes that get it done.

This means that everything was new to me; working a full-time office job and the specifics of each role. Thankfully at each stage I've had excellent managers and wider teams around, who have been more than supportive. I always think the only stupid question is the one you don't ask - I've probably tested the limits of that with some more unusual queries, but it all helps to build a better understanding of a new subject.

While there has been a lot of new information to take in, in the energy and environmental sectors there are a lot of transferrable skills that can be applied. For instance, writing reports for a job isn't too different from writing essays for a degree!

Now, I can't really imagine working in another industry. A large proportion of the country's greenhouse gas emissions come from housing, and social housing is around 18% of the UK housing stock. This means you can make a real and impactful difference through decarbonisation and energy efficiency improvements.

What is the favourite part of your job?

My job involves working with data, writing reports, and communicating ideas. But I'd say the biggest thing I work on, and my favourite aspect, is problem solving. Whether that's a small day-to-day thing, such as "how do I get my excel sheet to do this?", up to playing a (very small) part in the biggest issue humanity faces – "how do we solve the problems of climate change?". As with any kind of problem solving, you get a real buzz when you manage to crack the case.

The work is varied, has a range of climate and social benefits, and you can often physically see the results of the work too. I can go out to site and see the new insulation and heating system installs, I can chat to residents about their warmer home and lower bills, and I can walk around the greener neighbourhoods I've worked on – this is the most rewarding aspect.

How do you see the profession developing in the future and where would you like to be in 10 years?

Honestly, I would be very happy doing the same role in ten years' time, so long as the level of impact continues to grow. Ten years takes us to 2032, by which time social housing will have to be much more energy efficient, with the next milestone being carbon neutrality. That will be a big step requiring changes throughout the energy system, not least with a large increase in renewable electricity.

A major change we'll see in the profession is just in terms of growth and scale. There's a lot of work to be done and not enough people doing it currently, so expect to see a lot more advertisements for "retrofit co-ordinators", "sustainability officers" and the like. Along with this will come more money. Government already

> THERE'S A LOT OF WORK TO BE DONE AND NOT ENOUGH PEOPLE DOING IT CURRENTLY, SO EXPECT TO SEE A LOT MORE ADVERTISEMENTS FOR "RETROFIT CO-ORDINATORS", "SUSTAINABILITY OFFICERS" AND THE LIKE.

has large pots of funding lined up for renewables and retrofitting properties, but more will be needed. Some will likely come from private investment – in social housing, care will need to be taken that any strings attached to this finance don't negatively impact residents.

I think another change will be the energy and environmental sectors becoming more personable. We know what the solutions to climate change are, the barriers now are the money to do this, and overcoming resistance from those affected. Each household has a slightly different circumstance and so can act as a challenge. The onus is on us as energy professionals to make the right choice for the environment the easy choice, by explaining the benefits in a way that aligns with each individual's worldview. A climate denier may still want insulation if it will lower their fuel bills! There will need to be changes at both ends of the energy management spectrum, from huge investments in infrastructure projects, to better one-on-one relationships with customers.

Author's Profile:

Jack holds First Class Biology degree from the University of Oxford and previously worked at Gentoo in a similar role as a Sustainability Officer. The focus of his current role is technology upgrades of the association's circa 18,000 homes as well as sustainable transport, recycling and upskilling staff on environmental issues.

Rachel Feeney, Energy Analyst at Erda Energy Ltd

What made you choose a career in energy management?

Growing up in Massachusetts I always had a passion for the environment and the outdoors. At age 13, my family and I took a trip to Ireland to visit extended family. This was the first time I was exposed to jobs in clean energy. One of my cousins worked in the solar industry and now does site planning for wind farms. Another cousin was working as an environmental planner in a lakeside community. I was truly fascinated by their careers and knew it was something I wanted to pursue.

Years later I enrolled at an environmental university in New York (SUNY-ESF) and began studying forestry and natural resource management, but it wasn't the right fit. I changed my major to Sustainable Energy Management, and everything fell into place. I began to excel and was immediately excited about the possibilities in this industry. The sustainable energy management program was new at the University, so the department was always making changes to its curriculum and adapting to what the industry needed.

Moving to the UK for my first job out of university was a challenge. I had no personal or industry connections when I arrived and working for a small company it was difficult for me to expand my network. Fortunately, professional organisations have been a great tool in helping me expand my network and grow my industry skills.

I also found many differences in the UK energy industry that I hadn't considered, like measuring temperature in Celsius rather than Fahrenheit and then the more complex differences in the policies, incentives, markets, and government frameworks around things such as low carbon heating. I was able to explore the bigger differences through discussions, webinars, and just my own internal research. I also have great mentors at work!

Although there were challenges to starting a career in a new country, I would not have changed my experience for anything.

What is the favourite part of your job?

My favourite part of my job is seeing the positive impact we are making on our client's energy use. We are constantly working to improve the efficiency of our systems through new ideas and getting creative on how to operate our ground source heat pump systems. Seeing these ideas implemented is very rewarding because they generate substantial cost savings and overall decrease our client's carbon and energy output.

How do you see the profession developing in the future and where would you like to be in 10 years?

In the future, I see energy professionals working much more closely in collaborative environments. Unfortunately, I think there is a level of stubbornness that is visible throughout the industry where people and companies feel their technology is the "best". We know that it's going to take everyone working together to develop climate solutions, so that joint effort needs to start now with implementation of all technologies across sectors. Some technologies may be more useful as transitional technologies, but all should be considered and used where feasible. There should also be a balance between future heating (energy) technologies and what technologies and fuel sources we have available today, and really make use of those.

Over the next few years, I see myself expanding my knowledge across different areas of the industry and becoming a well-rounded energy manager. I hope to have diversified my skills in a wide range of building types (and other sectors) including domestic, commercial, and other specialised buildings. I also look forward to collaborating with my industry peers.

> "UNFORTUNATELY, I THINK THERE IS A LEVEL OF STUBBORNNESS THAT IS VISIBLE THROUGHOUT THE INDUSTRY WHERE PEOPLE AND COMPANIES FEEL THEIR TECHNOLOGY IS THE "BEST".

In 10 years, I see the UK being in a position where all new builds are operating efficiently at Net Zero and we are well on our way to retrofitting all other buildings to meet this goal. I think this will lead to the opportunity for more energy managers to help communities and countries that are still struggling from an energy point of view, I'd like to use my expertise and work with them to develop their own low carbon energy solutions.

Author's Profile:

Rachel joined Erda Energy as an analyst in 2018 after graduating from the State University of New York College of Environmental Science and Forestry with a degree in Sustainable Energy Management. She lives in London and loves trail running and hiking in the Surrey Hills.

Cai Hayes, Sustainability Co-Ordinator at Essentra PLC

What made you choose a career in energy management?

The interactive and diverse nature of my sustainability-based university master's degree last year opened my eyes to the possibility of pursuing a career in sustainability and energy management. Looking back, it provided me with opportunities to apply my academic learning to real-world decarbonisation challenges in the energy and manufacturing sector, whilst working with inspiring and world-leading climate mitigation experts such as Professor Tim Lenton.

One aspect of the course, the academic internship with Lloyds Banking Group, was particularly influential in making me choose a career in sustainability and energy management. I was well supported by passionate members of Lloyd's sustainability team in delivering a cutting-edge solutions research project which focused on using expert opinion to estimate the cost and CO_2 removal potential of Carbon Dioxide Removal technologies such as Bioenergy with Carbon Capture and Storage (BECCS) and Direct Air Carbon Capture and Storage

(DACCS) by 2050. My findings revealed that without accelerating the process of energy decarbonisation and promoting the production of renewable energy to break the carbon lock-in, implementing these innovative CO_2 removal solutions on a global scale would not be possible.

Participating in this partnership opportunity between academic institutions and businesses, has opened my eyes to the importance of clean energy and the further technological innovation required in the sector to successfully tackle climate change and reach the Paris Agreement goals set out by 2100. During my professional career, I hope I can play a small part in the transition to a more efficient and circular energy system.

What is the favourite part of your job?

The nature of my role as a sustainability coordinator for Essentra PLC, a leading global manufacturing and packaging company allows me to take part in a diverse range of exciting and cutting-edge sustainability projects and initiatives.

My favourite part of my role is my work on Life-Cycle Analysis. I am currently using this evolving research tool to evaluate the environmental impact of Essentra products through its life cycle, from extraction of raw materials to the final disposal. I enjoy the investigation and problem-solving aspect of this work, which means following the supply-chain back to the very beginning to work out the wider environmental impacts of our products.

This work also underpins the company's sustainability mission in 2022, by forming a value chain emissions inventory to start the process of calculating our overall Scope 3 emissions and committing to long-term Scope 3 emissions reduction targets.

In addition, I also enjoy the responsibility of coordinating educational sustainability workshops and learning material to reduce energy consumption across all of our sites. The global reach of my role is exciting, and I hope to partner with global sustainability initiatives such as Earth Day to promote sustainable practices among our employees which span beyond the workplace and into local communities.

How do you see the profession developing in the future and where would you like to be in 10 years?

There's no doubt we are a profession that is growing and still evolving. I think decarbonising the energy sector is the next step if the UK is serious about drastically reducing its CO_2 emissions and to reach net-zero by 2050. As a result, I see the demand for sustainability and energy management professionals drastically increasing over the next 10 years, as the national focus turns to managing renewable projects and battery storage innovation in order to supply reliable and sustainable green energy to the UK and beyond.

> "I HOPE I CAN PLAY A SMALL PART IN THE TRANSITION TO A MORE EFFICIENT AND CIRCULAR ENERGY SYSTEM.

On a personal level, I would like to achieve a Practitioner membership with IEMA and use my knowledge and experience to lead and support other enthusiastic and passionate individuals who are also looking to make a difference within the energy management or sustainability industry. I'd also like to be involved in ambitious policy-making and to be heavily involved in the transition to a zero-carbon economy, which is required to make a real difference in tackling climate change at source.

Author's Profile:

A passionate BSc Geography and MSc Global Sustainability Solutions student, graduated from the University of Exeter, with expertise in corporate sustainability and climate change science. A self-motivated researcher committed to applying technical competencies to support Essentra PLC as a sustainability coordinator in reaching their science-based ESG targets.

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Professional status awarded for successfully demonstrating the knowledge and skills in energy management.

Does the EMA Recognised Energy Manager status highlight your credentials as an energy manager?

JOEL KIRBY

"Absolutely, and this is one of the main reasons I wanted to become a Recognised Energy Manager. I would like to think that this also helps me to demonstrate competency to key members of staff within my workplace. It has not been long since I got the status, but it has helped from a confidence point of view if nothing else, knowing that your knowledge has been validated and that you do know what you are talking about."

ema recognised energy manager

PAUL GRAHAM

"Yes. It demonstrates a level of competency and knowledge which I have used to assure my organisation of my abilities."

KIRSTY RICE

"I think Energy Managers now are expected to also manage transport, waste and water – pretty much acting in some ways as an Environmental Manager. Having the EMA accreditation on my CV certainly allows me to demonstrate my professional aptitude in this area and a desire for continuing development which I think employers expect to see."

REWARDING ENERGY MANAGEMENT KNOWLEDGE AND SKILLS

CHARLIE COX

"It is nice to have the official endorsement of the EMA, and I am sure that it will increase my profile both inside and outside of my organisation. My natural position is to think that it shouldn't matter what qualifications or recognition someone has, as long as they do a good job. However, in reality it is essential for an energy manager to be seen as credible by a broad spectrum of colleagues, in order to garner support for the important work that they do."

DEWI DAY

"I believe that an energy management training programme like this is an important aspect of my career development and has helped broaden my skillset. I have learnt a great deal from the modules that I completed as part of this programme as well as other professional training courses. Shortly after gaining the EMA Recognised Energy Manager status, I was recognised as a star performer in my department at QinetiQ. I also believe that having a recognised energy management qualification can strengthen a CV and help future career progression."

MOHAMMAD RAFIQUE

"I believe this credential had given me a strong recognition of my skills and knowledge in this field. This is an evidence of my continuous development journey that I am connected to current good practice and being up to date with knowledge."

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ema energy managers association

by The Energy Managers Association

My Role in Tackling Climate Change

The professionals in energy management, sustainability and environmental roles play a key part in organisations' plans to deliver on energy efficiency and Net Zero targets. By performing their everyday roles, investing in professional development and exchanging of ideas and experiences with others, they are contributing to tackling the risks of climate change on organisational as well as national level. With all the varied roles and tasks, we are keen to showcase our members' skills and day-to-day tasks. In this issue, we have asked Christopher Forster about his role of Principal Sustainability Consultant (Energy & Heat) in tackling climate change.

What attracted you into the industry?

As a graduate in Environmental Chemistry, working in a lab was never a career ambition of mine. However, I was initially intrigued by Energy and Sustainability in a broader sense after undertaking a number of internships working on energy efficiency and low carbon engagement projects within higher education institutes in Glasgow. The fundamental question of how we tackle climate change and manage our ever-increasing environmental impact resonated with me and although I hadn't really figured out how I fit into the equation, I felt sure I wanted to pursue a career which was Sustainability focused.

How have you started and progressed through the industry?

Whilst studying a Masters in Sustainability & Adaptation with the Centre for Alternative Technology, I applied for my first role in the built environment with a consultancy based in Essex that was owned by a housing developer. I spent the next few years working on energy efficiency in housing projects for new and refurbishment, and gaining an understanding of SAP and Part L, this led on to energy modelling and audits to complete the group's ESOS compliance reporting.

I then moved into a more Senior Consultancy role dealing with energy strategy and master planning for large scale mixed used developments. It is here where I first worked on district heating projects, developing myself as a consultant engineer and broadening my technical and commercial expertise of low carbon heating and heat networks. As part of the role, I was supported through a MSc in Building Services Engineering and was able to appreciate the more technical elements of building services design as well an becoming a better project manager.

My initial consultancy roles have given me fundamental competencies that I still draw upon today, it is what has also galvanised my progression as a professional working in the heat network and the decarbonisation of heating space.

After 5 years in consultancy, I moved into operations and contract management of heat networks with London & Quadrant Housing Association and became much more hands on with the maintenance and optimisation of communal and district energy systems, project managing small works and system upgrades, whilst leading on the adoption of new networks. I became responsible for maintenance budgets and contract management of existing communal networks, as well as the procurement of new service provides across the organisation's estate. My time spent here gave me much more appreciation for the customer

journey and the need to engage communities in our roadmap to net zero, especially in the provision of such a fundamental service in heating and hot water.

Prior to my current role, I worked with the London Borough of Haringey delivering the Authority's ambitious plans to create a borough wide heat network. I was able to take a technical lead on the adoption and commissioning of the refurbishment of a heat network for the Broadwater Farm Estate. As well as working with planning and housing policy colleagues to develop new networks and charging and metering policy, whilst reviewing developers' technical submissions.

What does your current role entail?

Turner & Townsend has a renowned global reputation for its Project & Cost Management services. However, we also have a team of 40+ passionate sustainability professionals who deliver services across Net Zero, Building Sustainability & Energy Strategy, and programme manage large government retrofit programmes such as the Retrofit Accelerator, Workplaces and Homes programmes.

Within the team, I'm currently active as a heat networks and heat decarbonisation subject matter expert, where I spend my time developing heat networks and decentralised energy projects with public sector clients. This includes acting as a strategic project manager supporting large government funding programmes such as the Greater London Authorities (GLA) Local Energy Accelerator (LEA) which provides support and funding for detailed project development, design and project management to Housing Associations, NHS Trusts, Higher Education Organisations and Local Authorities. The programme aims to support projects which can save 20,000t/CO_2e, and move large neighbourhoods to zero or low carbon heating and power solutions.

I also act as a technical lead supporting organisations on more traditional consulting engineering type projects, undertaking building surveys, design due diligence and compliance reviews of building heating systems and heat networks. My role is very new, and I have the opportunity to develop the service area into new markets across the UK and further afield.

In your opinion, what role do you play in tackling climate change?

The built environment accounts for 40% of the UK's CO_2 emissions and it's critical that we reduce the demand of our buildings through energy efficiency measures and transition to low and zero carbon power and heat solutions. The government has announced funding and defined the road map for building decarbonisation as part of the Heat & Building Strategy.

The varied nature of my role allows me to support organisations in developing a net zero strategy to delivery carbon reduction across their estates as well as getting involved in the day-to-day delivery of these solutions. This directly impacts the carbon reduction of buildings and helps to tackle fuel poverty by providing cost effective and low carbon solutions in installation and in operation.

What are the main challenges in tackling climate change/ delivering Net Zero targets at your organisation?

The organisation has set out its long-term commitment to achieve net zero by 2030 across its business operations as part of its New Leaf pledge which focuses on aligning strategy to science-based targets and to the UN's Race to Net Zero commitments.

This is a good step forward, but as a global business understanding what these commitments mean to teams and staff on a micro level is still a little less clear. Helping our teams become more carbon literate and changing the mentality of our normal ways of working where sustainability is a nice to have rather than a need to have is a key challenge, but one where I see colleagues across the organisation taking steps to champion sustainability across their business remit.

Often the challenge isn't due to a willingness to change but often the difficulty in identifying where to start and how to define sustainability and net zero commitments to specific departments and specialisms. To achieve our net zero goals, the challenge is to take our strategic commitments and look at them with a regional lens to ensure they can fit in with local client needs and that our supply chains are empowered and engaged to enact these desired changes.

> "OFTEN THE CHALLENGE ISN'T DUE TO A WILLINGNESS TO CHANGE BUT OFTEN THE DIFFICULTY IN IDENTIFYING WHERE TO START AND HOW TO DEFINE SUSTAINABILITY AND NET ZERO COMMITMENTS TO SPECIFIC DEPARTMENTS AND SPECIALISMS. .

In your opinion, what is the order of importance for the three key aspects of tackling climate change – finance, skills, technologies.

In respect to technologies, innovation will continue to happen as there is no silver bullet to tackle climate change, engineering systems will become more efficient, data solutions will become more intelligent and new

products will come to the market. Fundamentally, I believe we have the technological tools to take the steps needed to meet net zero in the built environment today, what still trails behind in some ways is the finance, governance, and skills to implement these technologies at scale and pace.

The example I would draw upon is heat pumps and the electrification of heat. There is a lot of movement in the marketplace to install heat pumps as a solution to replace domestic gas boilers. However, heat pumps are not a new technology, we just don't have as much of a mature market in the UK as other European countries due to our historical reliance on gas. The premise is fine, but in the current market heat pumps are still not an attractive purchase for the consumer when comparing costs, and there is currently a lack of skilled installers with the experience to meet the government forecast for the number of heat pumps required to be installed. One of the challenges in the next few years will be managing energy prices and taxation on electricity, to ensure society does not become fuel poor as an impact of the low carbon transition.

What is your biggest achievement to date that has contributed to tackling climate change?

I have worked on a lot of interesting projects that have contributed to lowering carbon emissions within building projects. I don't believe that there is single large achievement I'd pick out and would focus on taking project lessons learnt forward and ensuring consistency in their delivery and helping to deliver emissions savings from design through into operation.

What particular knowledge and skills do you see vital in reaching the national and organisational climate change targets?

The built environment supports roles across Engineering, Project Management and Real Estate as we decarbonise the specialisms of these roles are needed to meet our day to day challenges. These more traditional roles will also have to develop more agile skills sets, where all professionals are carbon literate and understand strategy and longer-term goals to reduce carbon.

The construction industry traditionally has been slow to move with the times but I see innovation coming to the fore across energy projects, where digitalisation and availability of data are playing a big part in reducing the performance gap in building management and operation. The availability of data means greater collaboration is needed across the sector and that new skills i.e., software development and data science are increasing in demand.

It is this coupling digitalisation and core skills in sustainability which I believe will drive us forward to achieve net zero ambitions.

Thinking about current Government policies and incentives in delivering on the UK's climate change promises and Net Zero target where would you like to see more developments and guidance?

The heat networks market is still developing in the UK, and regulation will come into the market over the next few years, with Ofgem being appointed as the regulator. This will drive quality and customer protections in the market. Government policies and funding programmes are driving the delivery of high-quality low carbon networks, the heat networks investment fund (HNIP) and the new green heat networks fund (GHNF) are examples of current and upcoming programmes which have developed large scale heat networks and will ensure further investment can be brought forward.

I would like to see more revenue funding pathways coming forward from government policy, the feed in tariff and renewal heat incentive are examples of where revenue funding was unlocked to bring forward new projects and which allowed them to be financially viable. Furthermore, thought is needed on how to deliver long-term financial stability of projects, particularly when energy prices are so volatile.

Where do you see your future within the industry?

I'm just getting started in a new position and I'm excited to see where this takes me. I'd like to develop our heat networks service offering and deliver projects here in the UK and internationally. In the longer-term I'd like to undertake a PhD or DEng and contribute to academic research in the sector.

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4th	On-site Electricity Generation
10th	Become an ESOS Lead Assessor
11th	Waste Management
18th	Energy Monitoring, Targeting and Validation
24th	SECR Compliance
25th	Net Zero Fundamentals and Strategies

APRIL

8th	Energy Auditing Techniques
28th	Turning Data into Energy Savings (in-person)
29th	Energy Procurement

MAY

5th-6th	Fundamentals of Energy Management
13th	Battery Storage for Business
20th	Lighting – Basic Understanding
27th	Reaching Net Zero

JUNE

17th	Water Management
24th	Essential HVAC Control and Optimisation
30th	Understanding and Delivering Behavioural Change Programme (in-person)

SEPTEMBER

22nd-23rd	Energy Management in Building Services

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by The Energy Managers Association

CAREER INTERVIEW

Career in Energy Management - Fighting Climate Change in Nigeria

What attracted you into sustainability in the first place?

I'm Kelvin Enumah, a Programmes and Sustainability Manager at the Wetland Cultural and Education Foundation, where I am involved in technical and vocational training, youth development, talent engagement, optimised operations, and partnerships in Nigeria. To describe me in short: my career is practically focused on mutually dependent goals of developing people to promote sustainability.

I strongly think growing up and living in Nigeria is enough of a driver to go into the sustainability sector. I decided to study electromechanics at the Institute for Industrial Technology in Lagos. While studying, I started volunteering at the institute by designing and implementing campaigns and advocacy projects. We visited schools, churches, exam centers, etc. We reached and generated over 1000 contacts in all. We made presentations in schools about the need for skills and the need for parents to stop the stigma against technical education in Nigeria. This stigma that is yet to be overcome is mainly a result of the unattractiveness of technical and vocational education in Nigeria. The budget for technical and vocational education is only about 0.2% of the national budget for education (and the budget for education is less than the recommended 15% of the federal budget by UNESCO). Industries are yet to embrace Technical and Vocational Education and Training (TVET) and the dual training system; hence very few industries fund TVET compared to the expected outcome. The national TVET pathway policy exists but is not being implemented, and TVET graduates are highly marginalised and at a disadvantage during application for jobs and further studies. The system is disincentivised and not dynamic enough to cope with its socio-economic realities. These put together have disenfranchised many youths and families from towing this path.

During one of my visits, I went to a pig farm in one of the local communities in the southwest of Nigeria, all dressed and hoping to impress the youth working there and convince them to acquire technical skills. After speaking on the benefits of TVET and all, one of the fellows asked me loudly if he would be paid to learn skills. I was awed as a fellow youth, which left a deep impression on me.

How did you progress through your career?

As part of my three years dual training electromechanics programme at the Institute for Industrial Technology, I was equipped with a multiskilling technical background and mindset. I interned in the engineering department at Guinness Nigeria Plc., where I carried out electrical and automation duties in the silo, process, and utility areas. I also played the role of secretary for the department – in summary, I learned how to work with people and with machines. I also interned in the maintenance department at Leoplast Nigeria Ltd., a plastics manufacturing company. In both companies, I saw recycling and reusing first hand – this practically prepared me for the future.

In 2013, I started working in a social TVET project as an industrial automation and optimisation trainer at the Institute for Industrial Technology. I trained young school leavers, university graduates, and industry workers in the use of hydraulics and pneumatics technology, electro-pneumatics and sensor technology, programmable logic controllers, and process control. Using my knowledge of industrial automation, I completed a building automation control project in 2014, which was the start of building management systems for me. I became interested and completed some Schneider's Energy University

courses and advanced training in KNX systems. I ended up designing a building management system curriculum and content. At this point, I had already completed my City and Guilds of London Institute Level 3 in Electrical and Electronics Engineering and Level 5 in Engineering Qualification.

I soon saw the need for professional membership and registration following my professional activities. I decided to join the Energy Institute and got registered as an incorporated engineer with the Engineering Council UK and completed the City and Guilds of London Institute learning, teaching, and competence assessor certification.

I started volunteering more often with energy and tech startups and with technical vocational education and training, education, and women empowerment non-profits; as of today, I have volunteered with at least 5 organisations. In 2019, I started and launched the Energy Institute Young Professionals Network Nigeria and handed over to my successor at the end of 2021. I've recently taken up a programmes and sustainability role in another organisation, and I must say that the build-up has been incredible, a lot learned, and much more to be learned and done.

What does your current role entail?

I am presently a Sustainability and Development Manager with Wetland Cultural and Education Foundation. Wetland CEF promotes sustainability in Nigeria and focuses on providing programmes, communication, and financial sustainability support to non-profit organisations and social enterprises. Wetland CEF also develops clean energy and climate improvement projects (like; designing energy management training curriculums, providing training in building management systems and technologies, and organising energy awareness programmes for students). I provide operational, programmes and financial sustainability advice to about 20 organisations in varying sectors across the Nigerian economy.

What are the challenges for energy management and sustainability in Nigeria?

The main challenges lie in the limited energy access in Nigeria; according to Sustainable Energy for All (SEforAll) and the World Bank, as of 2015, the electricity access rate in Nigeria was nearly 60%, with 86% of urban areas and 41% of rural areas with access. It might also be necessary to know that the population of Nigeria as of 2016 was 186 million. Fast forward to 2019, the population was around 200 million and electricity access was at 55.4%. Nigeria ranks 171 out of 190 countries in getting electricity – with over 43% of its population not having access.

"Over 85 million Nigerians still don't have access to grid electricity" – World Bank.

Some years ago, the Power Holding Company of Nigeria (PHCN) was eventually unbundled by the government and divested into eleven electricity distribution companies (DisCos), six generating companies (GenCos), and a transmission company (TCN) . As at 2014, with 23 installed fossil fuel power stations, 1 coal-powered plant, and 4 hydroelectric power stations Nigeria had an installed power generation capacity of about 10,000 MW but only a maximum of 4,500 MW was being generated. Today, Nigeria has a capacity of over 13,000 MW and according to the Nigerian Bulk Electricity Trading PLC., 1,936MW of hydro, 1,080MW of solar and 11,560MW Gas/Thermal of generated electricity is sold to the transmission company of Nigeria. Still electricity access is at 60%.

Many homes, businesses and companies are beginning to see the need for renewable/alternative sources of energy. There is still an unreliable electrical grid in Nigeria. There is always a need to decentralise, distribute and democratise access to energy. The drive for effective metering is increasing and installations are quite rapid. Many renewable energy start-ups are springing up and this is driving the purchasing cost lower when compared with previous years and options are more now at least.

Several years ago, in my role at the Institute for Industrial Technology, Nigeria was gearing towards implementing the privatisation policy of the power sector and a problematic skills gap was emerging. It was inevitable that partnerships were needed to tackle this identified skills gap. Examples of this is the Seeds of Hope Project with the Institut Européen de Coopération et de Développement (IECD) , Cummins, CFAO and Scheneider Electrics, to develop the Electrotechnics programme and train out-of-school youths that would fill the skills gap in the power sector and be uplifted from poverty. The overall impact was significant: over 500 youths have enquired about this programme, best 90 youths selected and trained and 90 familes have benefited from this programme and have been uplifted from the cycle of poverty. Between 40 – 50 youths are currently in training at present.

Though the electrotechnics programme had the power sector as its primary impact area, I have handled over 10 recruitment requests from other engineering sectors for graduates of this programme. It promises a lot to know that there are graduates from an energy focus programme fitting into other sectors in roles like; maintenance technician, packaging technician,

service technician, facility manager and so on. This programme remains an impactful one in the Nigerian society as I have been working ceaselessly on sustainability models for this programme. While speaking with Henrie Adesina one of the programme graduates recently about his career and interest in energy, he said; "I am grateful I started my energy career as an electrotechnics trainee at IIT and went on to intern with Cummins".

What is your biggest achievement to date?

In a few words – it has been empowering youths and developing communities.

I would say my most significant achievement to date is starting Rivents Lab. In 2017, I saw the need to set up a team of enthusiastic, hands-on technical students and graduates of the Institute for Industrial Technology to think, design, and recreate, focusing on climate-friendly and clean energy solutions. The team started by making motobots with used plastics and discarded furniture parts for secondary school students. In 2020, the team's ability was tested through a grant competition to prototype a locally made ventilator. The team emerged co-winner for the NgVentilator competition after prototyping a low-cost, climate-friendly, battery-powered, and phone-controlled automatic ventilator. We hoped the ventilator would be mass produced to support many patients dying of Covid 19 due to inadequate ventilators; unfortunately, it didn't. I hope someday to see Rivents Lab in full operation with its own lab space and more inventions.

What are the climate change drivers in Nigeria?

Education is very essential for the energy transition and sustainability in Nigeria. More short, mid, and long-term programmes will create the necessary awareness, knowledge, and skills for children and young professionals. Reducing the entry barriers for these programmes, decentralise and being consistent. Education, education, education is the key.

More small grants with considerable access requirements for rural and urban development are certainly a meaningful way to journey towards the net-zero goal in Nigeria, having ratified the Paris agreement on climate change in 2017 and aligning with the UN SDG, it has pledged to reduce its greenhouse gas emissions by 20% by 2030. The UN SDG index shows that Nigeria is on track to achieving this.

Properly designed funding programmes to upskill, educate, provide access to power, reduce wood burning (which, according to studies by ICEED is still the cause of 78,000 premature deaths and about 55 million metric tons of carbon dioxide emission), manage waste and recycle plastics (only about 12% are currently been recycled and most of the unrecycled contributing to the blockage of drains and canals), electronics, batteries, and even photovoltaic panels (about 140 tons of solar waste) will be impactful. There is a popular secular saying in western Nigeria "Owo ni koko!" Which literarily means, "Money is the key".

Where do you see your future within the sustainability sector?

For my part, I clearly will continue working with people at an increasing rate to deliver sustainable development in Nigeria. I am currently seeking funding to continue my masters' programme, which I have already started in sustainable development and diplomacy. Within the next three years, I aim to design more capacity development and community-related programmes to impact up to 3000 youths. I hope to grow a development fund for the technical and vocational schools that will promote sustainability by training youths from resource-deprived backgrounds to $100m in order to scale their impact by 50%. Ultimately, we need a people-centered approach in Nigeria, building a just society that will succeed in the once-in-a-generation challenge of tackling climate change. I hope to take on more roles in the sustainability sector to broaden my exposure further and grow my experience.

by Chris Bowness, Senior Energy Manager at FES FM Limited

TECA Energy Centre – two years on

Opened in September 2019, the Event Complex Aberdeen or TECA is a £333 million development commissioned by Aberdeen City Council (ACC). The development consists of P&J live, a 48,000 square metres multi-purpose event space with a conference capacity of up to 10,000 delegates across nine meeting rooms, three conference and exhibition halls and a 15,000-seat arena. Onsite is also a 200 bed Hilton hotel, 150 bed Aloft Hotel and an innovative energy centre.

The development features an Anaerobic Digestion (AD) plant that produces biogas using both agricultural and food waste. This gas is conditioned and provides renewable gas to the natural gas grid and it can also be used by the TECA energy centre. The AD plant is self-powered with a 500 kWe gas engine producing electricity and heat for the facility. The AD plant was constructed and is managed by a specialist provider on behalf of ACC.

The energy centre is a hybrid combined cooling, heating and power (CCHP) installation and was of a modular design that was installed by the company that I work for, FES Group. FES subsequently were awarded the contract to operate the energy centre on behalf of ACC and I have been involved from handover to ensure that the consumption and output of the energy centre is effectively measured and reported upon.

The power, heating and cooling requirements of the site facilities are provided from here. As the demand is mostly heat driven, the energy centre exports electricity generation (average 800 MWh monthly) to the grid with a Power Purchase Agreement (PPA) in place to capture the value of the exported energy.

The energy centre installation consists of two 800 kWe Combined heat and power (CHP) gas engines as well as three 420 kWe hydrogen fuel cells – this made this site one of the largest fuel cell installations in the UK at the time of installation. The fuel cells currently consume natural gas as they have the facility to extract the hydrogen content from this fuel. There are also three 1 MW gas boilers installed to deliver back-up heat to the district heat network via 250,000 litres (8.75 MWh) of thermal storage. The gas engines and boilers output at a temperature of 82°c where the fuel cells output at 95°c and some of the fuel cell heat output is used by the absorption chiller which serves as lead chiller to the district cooling network, which also has 250,000 litres (2 MWh) of thermal storage.

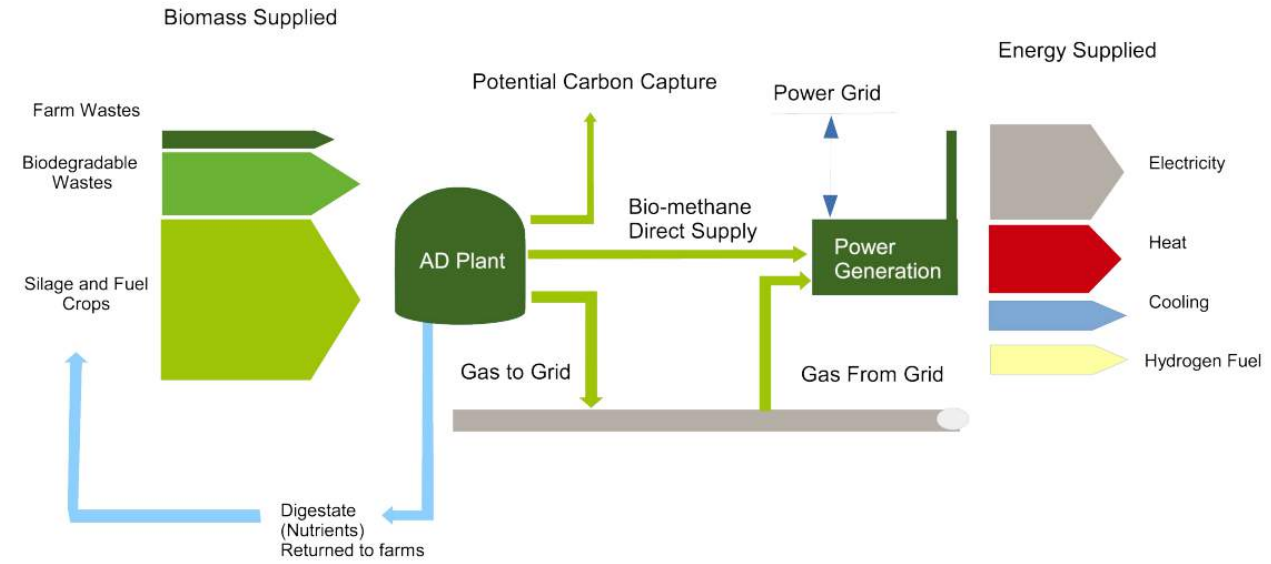
The cooling systems comprise the lithium bromide absorption chiller which takes heat at 95°c from the fuel cells and produces 400 kW of cooling. This lead chiller is further backed up by two 480 kWc electric chillers with heat rejection by hybrid coolers common to all.

With the thermal storage facility, the energy centre team can opt to run generation when heat or cooling is not needed and it gives some flexibility to keep the plant running optimally to suit the various demands from day to day.

The energy monitoring of this site involves 122 electricity, gas and heat meters which are used to report all aspects of operation so plant performance information can be reported to the site manager. I was responsible for devising a metering strategy to report performance and this has been done so that the main meters automatically check the sub meters, so that the daily reporting is self-verifying. This allows us to identify plant efficiency and losses such as transformer, heat losses and cooling gains. Despite the quantity and variety of meters, the metering has been robust to date.

My duties also consist of annual reporting to the combined heat and power quality assurance scheme (CHPQA), which is now in the third year. This was challenging to set up due to the complexity of the installation. We also report the GHG emissions of the generation to individual site level which has required some extra thought as to the necessary calculations.

The next stage of the energy centre evolution has the potential to be the



most exciting. In the energy centre there are installed two 500kW hydrogen electrolysis units that may be used to produce up to 400Kg per day of hydrogen. The production of hydrogen from the energy centre may be able to support the growing demand for hydrogen in Aberdeen, including the refuelling of fuel cell buses. Aberdeen is blazing a trail with hydrogen where they already have a growing fleet of hydrogen vehicles and two refuelling stations. Production of hydrogen from the energy centre at TECA will offer Aberdeen increased capacity and more flexibility. An advantage of the TECA energy centre is that electricity that is currently sold to grid is cheaper than facilities where they must buy the electricity from the grid to generate hydrogen.

With the AD plant producing renewable gas onsite this means that the TECA's energy consumption is carbon neutral and with the production of hydrogen it will be powering buses around the city with zero emissions.

The production of hydrogen will give the site team lots to think about as they will have to tailor demand for hydrogen against demand from site.

Where there is a shortfall of heat driven generation, the electricity required for hydrogen production will have to import mains electricity. This will prove a new challenge for the site team to gain maximum value from the available generation.

The energy centre is complex and therefore it has taken some time to get to grips with its unique features. The fuel cells need to be used as baseload as they consume quite a lot of fuel on standby, so they are best to be either on or off. When the fuels cells are switched off however, they can take up to two days to start up again.

We have spent time with a specialist who has modelled the plant operation in detail and it helps us to understand the little things that can add up to impact on the plant's overall efficiency.

For instance, if fin fan coolers are running when the CHP is operating and how this can be reduced. Some small changes added together can make a bigger difference.

The biggest lesson for me has been to evolve the analytics of the metering, where as the plant functions change, with the likes of hydrogen production, the numerous inputs and outputs will influence the economics of the plant. In time once the analytics has matured, not only would the site team be aware of the real time economics of production, but this could be integrated into the controls package via algorithms that provide a feedback loop to allow routine changes to be dealt with automatically. This would be challenging, but ultimately rewarding.

Author's Profile:
Chris has worked in the FM industry for over thirty years and in Energy Management for half this time.
He is responsible for the energy management and reporting for a large portfolio of PPP sites and energy centres throughout the UK, including ISO50001 certification and SECR reporting for his organisation.

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