

# THE EMA MAGAZINE

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## ENERGY MANAGEMENT & COVID-19 EMA survey results

## GROWING SUSTAINABILITY AMBITIONS AT UNIVERSITY OF READING

by Dan Fernbank

## ABERYSTWYTH UNIVERSITY AIMS FOR CARBON NEUTRALITY BY 2030

By Dewi Day

## THE DIFFICULT DECISIONS AROUND A LOW CARBON LIFESTYLE

by Jonathon Candy



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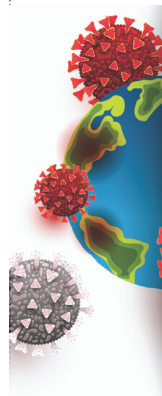
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# Dear Reader,

We hope that you and your family are well as we all adapt to a world coping with coronavirus.

The disruption to our personal and professional lives due to the Covid-19 pandemic has been unprecedented and challenging. Early on, the EMA survey on the topic showed how our members in various industries are affected and, as always, we have asked for useful tips and reflections on the situation that we are sharing with you in this issue.

Whilst the focus in the first weeks was on lockdown procedures, the fact that many of our members are able to work from home has also seen a shift in focus towards professional development, and we are pleased that you are finding our online resources useful. Many of the EMA training courses are now available online, a new guide to Energy and Climate Change Regulations was added to our selection of practical guides and new sections with our past career and industry interviews was created for your inspiration.

The EMA's shift from managing the immediate crisis to embedding new ways of working, teaching and planning brings new opportunities and ensures that we can continue to serve and engage with our community.

Once the current restrictions are eased, there will be new challenges and lessons learnt for energy managers as sharing and learning from each other continues to play a vital role. With this in mind, we hope that you will enjoy this issue that continues to draw on the members' knowledge and willingness to share.

Please stay safe and stay connected with the EMA.

The EMA Team

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**Save the date for**

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**2020**

**25<sup>th</sup> & 26<sup>th</sup>**

**November**

**ExCeL London**



# EMA Survey Results:

## Energy Management & Covid-19



No one could have predicted that the new decade would start with such a challenge and that a couple of months into 2020 we will find ourselves in such unprecedented circumstances. The majority of energy management world is on lockdown and everyone has been affected by the Covid-19 pandemic in some way. For some, the lockdown meant a gradual close-down of operations, while others shut down in a rush. Many organisations still play a critical role and must continue to operate, even if with restricted operations.

The EMA sounded out its membership on the impact of the pandemic on their operations and teams, as well as their reflections and tips on how to cope during this period. Energy management is often about pitfalls and opportunities, and the survey responses suggest that energy managers are already identifying the highs and lows that the lockdown is presenting. Whether it is the fact that the energy consumption and travel have gone down, or that there is more time available to develop future policies and proposals, here are the most frequent responses from the survey...

### The lockdown - direct effects:

Many of the planned energy improvement initiatives we had planned for 2020 are currently on hold.

It is more  
a case of  
**Business as  
Required  
rather than  
Business  
as Usual.**

The focus on energy reduction is relaxed during this period as the main focus is on dealing with the pandemic.

We are unable to  
trade, 95% of the  
business is in  
shutdown.

Now having twice weekly conference calls with directors to update on cash flow and billing for energy and water. So, that's a bonus.

Energy saving projects are affected due to the reduced on-site presence. We are attempting to maintain activity where possible. Operation & maintenance of renewable generation assets is business as usual. Resource levels aren't affecting this part of the team, yet.

**Projects have stopped. Some meters can't be read.**

Everything  
back to  
1975 pace.  
I am old  
enough to  
remember  
those days...

**All sites  
and offices are all  
fully closed down with  
all heating and  
electric equipment  
switched off.**

We cancelled any non-essential presence-based tasks (on-site auditing, routine meetings etc.) and prioritised operational, financial and business continuity activities.

Government measures seemed to have increased water consumption across Wales, which is increasing energy demand.



## The lockdown - tips to consider:

Energy management is not the top of everyone's list of 'important' things to do at the moment' - be pushy.

**Ensure skeleton staff know and understand the changes made.**

**Continuous data review - ensure that all sites are shutdown correctly, especially the ones that benefit from a BMS, as this could affect consumption going forward if indeed any scheduling has not been reviewed.**

**Daily monitoring of sub-meters has identified areas of focus. Skeleton teams are given specific tasks to check areas.**

**Continue a water flushing regime and heat water to prevent the proliferation of bacterial growth in water systems.**

**The lockdown will enable true base loads to be measured. Identify plant/equipment that should be switched off which will assist in setting reduced targets.**

The hiatus in work frees up time to focus on time consuming measures such as writing in depth policies, it could actually prove a useful chance to broaden the energy management strategy.

**Look for opportunities - there are some things you can't do right now. What could you do which you otherwise might have made time for? I'm thinking about future energy strategy for the site and catching up on some data analysis.**

Ensure staff are aware of procedures for shutting the office back down should they need to go in and use it for any reason.

**Consider what interim maintenance needs to be carried out even though the building is shutdown.**

**Continue to work on business cases, etc. in the background, but now is not the time to promote these.**

## The lockdown and beyond:

**Remote working might become more prevalent. The majority of systems including M&T and BMS can all be accessed remotely, meaning most tasks can be completed. Rapid increase in use of video conferencing etc. has shown that these can be effective means of communication.**

The price of oil, electricity and gas has collapsed. This could temporarily weaken the impact of energy management on an organisation, particularly if bottom lines have also suffered and staff resources are being downsized.



As the economy struggles to recover, then energy management practices may be lower down the pecking order than previous compared to other perceived priority obligations of organisations. It will be difficult to ensure that energy management is considered to be worthwhile exercise and management personnel will not have this high on the agenda.

It will highlight the environmental changes which are visible in the current situation (such as noise and air quality).

It will be a good measure of what can be achieved in a complete 'switch-off' scenario, perhaps leading to a better and more considerate energy management behaviours going forward.

Energy use in work premises will be greatly reduced raising fundamental questions around working practices and future use of work spaces. For example, why lease a large office building if you had a rotor of people working from home. Business travel, currently virtually zero - companies need to revisit the need for business travel and develop guidance to significantly reduce this in the future. The current situation shows that business meetings can effectively be carried out remotely.

Postponing implementing energy saving measures and potentially shelving them to free up cash to recover from impact the virus has had on the business.

Once re-opened it should be business as normal, however more emphasis may be on saving costs to make up for lost business.

The main impact is delayed decision making for medium to long term plans. Getting the executive team to re-focus on long term plans is hard anyway and in the current climate impossible. However, that doesn't stop me getting the papers ready now so that when we can think ahead again, we have options.

An ideal opportunity to look at base energy loads of buildings and examine areas of energy wastage and make comparisons with operational figures. Also, the need for buildings / overall capacity related to staff numbers could be fundamentally rethought in relation to home working.

Thank you for taking part.



### On a lighter note:

Don't sit too close to the fridge!

How are we going to get haircuts?

Have to talk to my wife a lot more!!





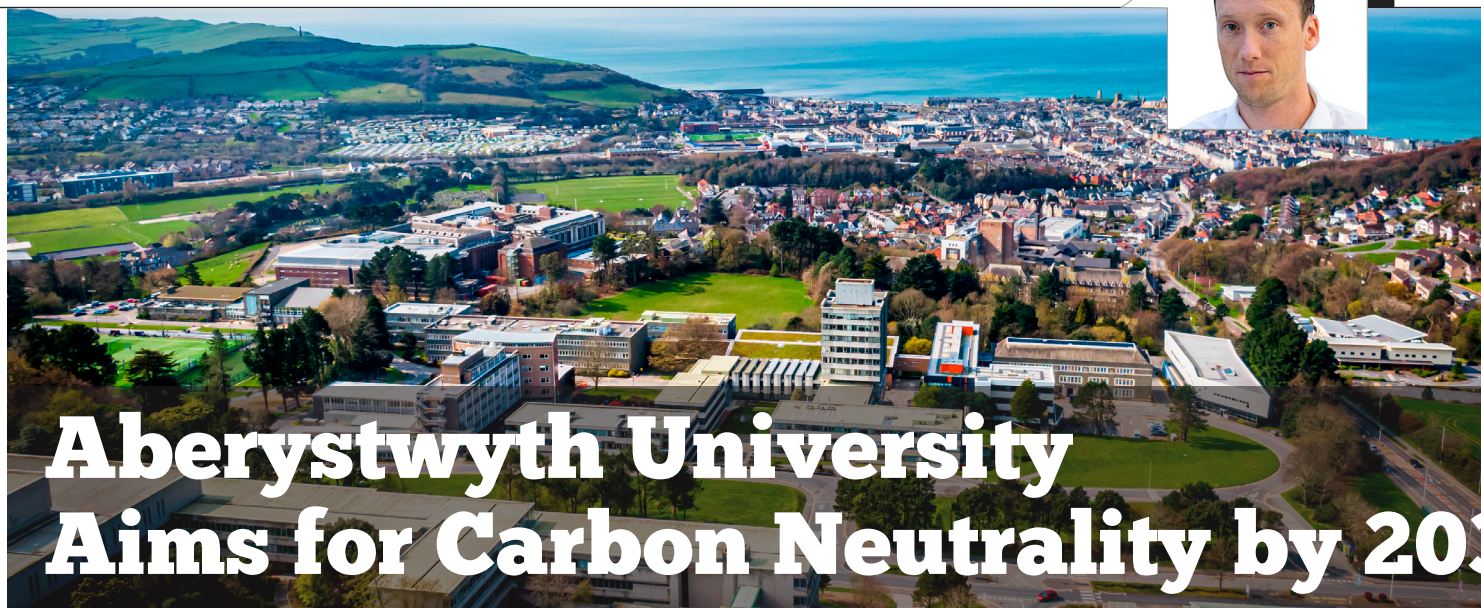
# Are you interested in becoming an EMA Corporate Patron?

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- the opportunity to gain the profile that your organisation deserves

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# Aberystwyth University Aims for Carbon Neutrality by 2030

**Established in 1872, Aberystwyth University has around 8,000 students and 2,000 staff. It was awarded University of the Year for Teaching Quality in The Sunday Times Good University Guide 2019, the first university to be awarded the accolade for two years running. The Sunday Times Good University Guide 2020 also awarded us Welsh University of the Year.**

The university's annual utility spend is circa £3.5M, with the majority of consumption at Penglais Campus, which has approx. 55 buildings, most of which were built between the 1960's and 1980's and consisting of office, teaching, commercial, sports facilities and residential.

In 2019, the Welsh Government committed to achieve a carbon neutral public sector by 2030. Whilst universities emissions were in scope of this ambition, they were not mandated to comply. Recognising the need for urgent action to combat climate change, the University Executive agreed to join public sector efforts and so voluntarily pledged to try to be Carbon Neutral by the end of 2030/31.

There are numerous challenges regarding achieving carbon neutrality within such a short time frame, such as incorporating

growth, decarbonising heat, funding mechanisms, etc., but in this article, I have tried to summarise just a couple of the issues that are particularly relevant to us in our initial stages at Aberystwyth University.

## Challenge 1 - Scope of emission sources

Although Welsh Government have set a highly ambitious target, they have yet to publish the final reporting requirements and scope of the carbon neutral ambition. It is anticipated that offsetting will not be allowed, which I think is a very bold decision. Offsetting

emission source and also the most difficult to decarbonise.

We are waiting for the final reporting guidance to be published before being able to commission a new Carbon Management Strategy. Developing the new strategy will require extensive data gathering and will take some time to fully develop both a baseline and an agreed action plan. We are already restricted by an extremely short time frame for a highly ambitious target, so to ensure that we are making progress in the interim, we have set-up working groups for each of the expected significant emission sources. We are also assigning senior management responsibility for each emission source. The groups established so far are: projects & construction, procurement, space use and heating, land use, travel and food.

The initial aims of each group are to explore short term measures for decarbonisation and to get the key stakeholders engaged and prepared for subsequent improvement requirements.

Whilst these groups have been pivotal in getting improvements going, setting a carbon reduction strategy that cuts across so many different areas of responsibility is a significant challenge, not only for us but across the entire sector as in many organisations energy managers tend to be focussed on energy use

“IT IS ANTICIPATED THAT OFFSETTING WILL NOT BE ALLOWED, WHICH I THINK IS A VERY BOLD DECISION.”

has often been seen as a way for organisations to continue operating as normal and just 'buy their way' to decarbonisation. This form of decarbonisation detracts from what really needs to be done to reduce emissions at the source.

It is also anticipated that it will include scope 3 emission sources, and whilst we don't currently have much data on many of our scope 3 emission sources, it is widely expected that this category, particularly purchased goods and services, is likely to be the largest



and have limited experience of implementing strategies for scope 3 emission sources.

## Challenge 2 – Emission factors trends

I have seen many organisations promoting significant emission reductions without acknowledging the impact that the reduction in the emission factor has had. The obvious risk with this approach is that it could lead to a heavy reliance on grid decarbonisation and not focussing enough effort on reducing energy use and on-site renewables.

The university's existing Carbon Management Plan, approved in 2015, only targeted electricity and gas emissions (as many carbon management plans have tended to focus on) and runs until 2020/21. At the end of FY18/19 we had achieved a 36% absolute reduction in emissions against our 2011/12 base year, however in this period our total energy consumption had actually gone up by 1%. This emissions reduction was mostly attributed to the changes in the electricity emission factor, which reduced by 44% over the same period, driven by grid decarbonisation due to a cleaner mix based on gas and renewables instead of coal. According to the National Grid's 'future energy scenarios', the annual emission factor reduction is expected to flatten out over the next few years. This will make reducing electricity emissions even harder.

In my view, the key to real decarbonisation is for organisations to be bought into a strategy that focusses on on-site decarbonisation activity with SMART targets that are linked to each key emission source rather than broad carbon reduction targets that can often mask inaction and be affected by so many other variables.

While we await the reporting guidance to begin developing our carbon neutral strategy, we are trying to address each significant emission source. Through the RE:FIT

Wales framework we are currently working on an initial £2 million energy performance contract, funded through Salix finance, and hope to complete subsequent phases in-line with our decarbonisation ambitions. We are also working on a feasibility of a private wire 3 MW ground mounted Solar PV array which, will hopefully provide approximately 20% of our main campus annual electricity requirements.

support and indeed has recently appointed an Executive Lead for Sustainability. By assigning senior management responsibility for each emission source, the action plan for each area is theirs to agree, implement and monitor. I have seen many sustainability strategies that struggle when they are being implemented without senior management support across all areas of the strategy.

Much of our understanding on the potential impacts of climate change and the requirements for rapid decarbonisation is coming from universities such as ours, and it is my view that we should therefore have additional responsibility to be trying to lead the way in decarbonisation.

“ I HAVE SEEN MANY ORGANISATIONS PROMOTING SIGNIFICANT EMISSION REDUCTIONS WITHOUT ACKNOWLEDGING THE IMPACT THAT THE REDUCTION IN THE EMISSION FACTOR HAS HAD. ”

## Final thoughts

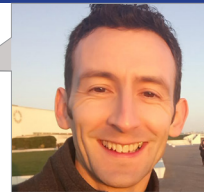
Because of the broad scope of emissions included, achieving carbon neutrality will undoubtedly require significant changes to the way that organisations operate, such as the procurement process, how we manage land, how we run our commercial outlets, how we travel etc. Many of the required changes will be met with some form of resistance and the challenge of getting everyone on board is a challenge that cannot be underestimated. The commitment and support from senior management is crucial.

At Aberystwyth University, the Executive Board has given its full

## Author's profile:

Dewi has been Aberystwyth University's Sustainability Advisor since 2017, a role which encompasses all aspects of energy management and environmental management. Prior to this, he had worked in a variety of roles over the last 11 years covering energy management, environment management and environment compliance. He is an EMA Recognised Energy Manager and CIBSE Low Carbon Consultant and has a PG Cert in Energy and Sustainable Building Design as well as an MSc in Environmental Consultancy. He is also a Chartered Environmentalist and Full Member of IEMA.





# Growing Sustainability Ambitions at University of Reading



**With an annual utilities bill of £6.2 million across 470 buildings and 393,000 m2 floor space, effectively managing energy and water at the University of Reading is both constantly challenging and regularly rewarding.**

I joined the University in 2011, around the time when the Higher Education Funding Council for England (HEFCE) was setting out ambitious carbon reduction targets for the sector. This included linking the Capital Investment Framework (CIF) funding for estate improvements to demonstrable progress with carbon reduction.

Fast-forward a few years, and we started to be recognised amongst the leaders in the higher education sector for delivering carbon reductions, which helped ensure that CIF funding for the University was forthcoming. Our carbon reductions now stand at 41% against our 2008/09 baseline, which has delivered £30 million in cumulative revenue savings. This has instilled a sense of belief that we have a track record of successful delivery, and that we can and should continue to build on this for the future.

## A new strategy

The university appointed a new Vice Chancellor, Professor Robert

Van de Noort, in spring 2019, who was previously Pro-Vice Chancellor, and has long been an active supporter of our sustainability work. His appointment has led to the development of a new strategy for the university, and after consultation with staff and students, environmental sustainability has been established as one of the core principles of the strategy for the years ahead. This is significantly raising the expectations to deliver even larger carbon reductions, with an expectation to deliver a net zero carbon position over the next 10 years.

This is very welcome, but presents some interesting challenges. On the one hand, we do not yet fully understand the most appropriate pathway to delivering net zero carbon emissions. This is causing some discomfort, as it contrasts with our approach to date of having clearly planned projects which collectively inform the setting of our next reduction target. On the other hand, I personally believe we can demonstrate leadership in the delivery of this ambition, and have as good an understanding as most organisations on the likely route to achieve it. I am therefore faced with reassuring the concerned, whilst at the same time, highlighting legitimate concerns that are yet to be addressed if we are to be successful.

Considering zero carbon delivery presents so many contradictions with my previous way of thinking. I have always favoured an 'efficiency first' approach to energy management, but I am coming to the conclusion that the urgency of robust climate mitigation action makes this something of a luxury we cannot afford (see my thoughts on low carbon heating below). Likewise, I have always believed in the mantra that if something is worth paying

for, it is worth making the case and paying yourselves. The cost to deliver a legitimate net zero carbon position over the next 10 years will require investment at a scale which is way beyond my current budget allocations – likely to be several £10 millions and therefore a material cost for the university. Considering alternative, external funding solutions (energy performance contracts) has therefore now become a key focus.

## Addressing energy wastage

The enthusiasm and expectation for climate action has never been as strong, or as sustained as I have experienced over the last 18 months. A very welcome position that has caught me a little by surprise. More and more, students and staff are approaching us asking what they can do to help achieve our carbon reduction ambitions, and we must capitalise on this to bring our University community along with us, and to embed a sense of ownership and collective responsibility.

At the same time, we continue to waste significant amounts of energy, particularly in leaving lights, systems and equipment running when they are not in use. Sometimes, this is just bad practice, and that lack of ownership is all too evident. Often though, the issues are more complex, whether that is due to poorly designed/maintained (or poorly operating) control systems, or generic assumptions about building occupancy which don't reflect reality. Enabling and encouraging our combined student and staff population of 18,500 to contribute to reducing this wastage has long been on our radar. The significant investments we have made in our utilities metering over the last few years makes this much easier to pinpoint than this once was.



Tackling this head-on over the next 12 months will therefore be a key focus, to embed a greater sense of responsibility and ownership locally, and to capitalise on the undoubted enthusiasm for sustainability action that currently exists.

We are intending to produce carbon footprints for each school and function, and to use this as the basis for engagement with students and staff on reducing their collective carbon footprints. This will have a key focus on out of hours energy use, but will also go beyond energy, to consider business travel emissions too, which for some schools can be as much as 60% of their carbon footprint.

### The heating dilemma

The vast majority of the university's 470 buildings are currently heated through fossil fuel combustion – either natural gas or heating oil. Just 5 buildings have alternative heating solutions; 1 ground source heat pump and 4 air source heat pumps. Delivering our net zero carbon goal will therefore require a major overhaul of the majority of our heating systems across the estate; probably the biggest challenge we will face from a sustainability perspective in the next decade.

When I wrote our last Carbon Management Plan in 2016, I identified the decarbonisation of heating as a key challenge to begin considering. 4 years later, we are yet to replace any heating systems, but at least have a somewhat clearer understanding of the opportunities and challenges ahead. Our primary focus will be on heat pump technologies, which we believe offer the best hope of delivering substantial carbon savings by 2030.

For our Greenlands, Henley Business School site, we have done a reasonable amount of investigation into the potential for an open-loop water source heat pump, fed from the neighbouring River Thames, to feed a small district heating network. This site is heated by oil, and therefore the relative utility cost and carbon reductions of a heat pump can be

substantial. This is however a sensitive site, requiring multiple permissions, consultations and agreements, and crucially, we are yet to find a funding solution to be able to deliver this project.

## “CONSIDERING ZERO CARBON DELIVERY PRESENTS SO MANY CONTRADICTIONS WITH MY PREVIOUS WAY OF THINKING.”

For our main Whiteknights campus, the likely solutions are less clear. In 2015, we opened a new Energy Centre, fed with a 1.2 MWth CHP engine and a total of 10.5 MWth gas boilers, feeding 16 buildings through a new district heating network. When opened, this scheme was delivering over 1,000 tCO<sub>2</sub> savings each year, but we did not foresee the rapid decarbonisation of grid electricity coming so soon, and the carbon case for gas CHP now looks increasingly questionable. This presents a dilemma, as we are saving in the region of £250,000 per annum in electricity costs from generating our own electricity onsite, and therefore transitioning away from our CHP engine will be costly. It will also however be essential, if we are to deliver a net zero carbon position.



Heat pumps have often been thought to only be suitable for low flow temperature situations. This is likely to require deep retrofits to many of our buildings, a costly and disruptive solution, which may prove to be unfeasible in many instances – and certainly, will significantly add to cost and delivery timescales. However, increasingly, high or very high temperature heat pumps are becoming available, and this presents new opportunities to consider

potential retrofits of heat pump technologies without such deep retrofits. Over the coming year, we will begin investigating what is achievable and appropriate for our Energy Centre, as well as considering our approach to the many buildings with standalone heating systems. Do we extend our district heating further, or should we favour a more localised approach to enable smaller-scale retrofits at a building by building level? No doubt, there will be more than one solution, but increasing our understanding of these opportunities now will be essential for the years ahead. We work closely with our maintenance colleagues, who equally recognise the challenges that delivering low carbon heating are likely to present. This in turn means we are able to pool resources to address some key challenges in a joined up manner.

### In conclusion

One of the joys of working in energy management is that there are constantly new challenges and new opportunities ahead. Currently however, these challenges and opportunities seem to be at a whole new level. From the internal sustainability ambitions of the University presenting new opportunities, to the urgency for robust climate mitigation challenging my long-held efficiency-first beliefs, it is an interesting time to be an energy manager. To be pushed out of my comfort zone after almost 15 years in energy management is a somewhat surprising but largely welcome position to be in. I hope my next 15 years are similarly exciting!

### Author's profile:

Dan has been Energy & Sustainability Manager at University of Reading since 2011, leading on the delivery of sustainability in their operations. Dan is also a founding Director of Reading Community Energy Society, delivering community energy schemes locally since 2016. He has a first class honours Environmental Studies BSc, and was named 'Public Sector Energy Manager of the Year' in 2019 by the Energy Managers Association.

# Stay Connected

## - Join Courses - Upskill Online

(Practical online training not only for energy managers)

### WHERE TO START?

1. Identify what you are looking for? Is it a fundamental energy management practice and technologies' overview? Is it an in-dept knowledge of a specific energy management area? Is it a regulatory compliance knowledge?
2. Email the EMA team to register for the course.
3. Undertake the course.

### WHAT'S ON OFFER?

#### **COURSES COVERING AN OVERVIEW OF ENERGY MANAGEMENT PRACTICES AND VARIOUS TYPES OF EQUIPMENT**

#### **FUNDAMENTALS OF ENERGY MANAGEMENT COURSE (2 DAYS = 10 CPD HOURS)**



This introductory course has been designed to provide a comprehensive and practical overview of

the key energy management tasks with an emphasis on the energy management knowledge and skills that are required from an energy management professional. To understand energy management, it is important to recognise that it can differ across organisations. As the course unfolds the overview of regular energy management practices applied to manage and save energy, as well as to decrease energy related costs and emissions will be presented and discussed. The goal of the course is to leave a lasting impression about what energy management practices can be applied within businesses, what can be done to increase energy efficiency

and what skills and knowledge are required to deliver these.

#### **Learning outcomes**

The course will help you to:

- Understand global view of energy consumption and its impact
- Define what energy management means for its practitioners and their organisations and /or clients
- Understand basic energy management practices
- Understand technical concepts of energy use
- Identify technical and non-technical responsibilities of energy management practitioners
- Understand basic monitoring and targeting principles
- Gain understanding of energy auditing
- Understand legislative compliance related to energy management
- Grasp waste and water management basics
- Gain energy procurement overview
- Understand relationship between all EMA Energy Management in Practice training courses

#### **ENERGY MANAGEMENT IN BUILDING SERVICES COURSE (2 DAYS = 10 CPD HOURS)**



Energy in buildings is consumed in a large variety of ways and on many different processes and types of equipment.

This course is designed to introduce many of the most common energy consuming systems found in existing buildings and their operations. Some of the basic legislation that may apply in buildings such as Minimum Energy

Efficiency Standard (MEES) is also covered during the course.

The course begins with describing the types of energy used in buildings and the basics of how they may be conditioned, including explaining power factor, how power factor correction works, 3 phase load balancing and voltage optimisation. It then continues with how electricity and gas is consumed in various types of equipment, discussing the main areas of energy consumption and the possible opportunities to change and reduce how energy may be consumed. The following areas are also covered during the course delivery: heating and cooling systems (including recovery of both), hot water systems, air handling and conditioning systems, lighting and their associated control systems as well as renewable and low carbon generation systems producing heat and power.

#### **Learning outcomes**

The course will help you to:

- Identify the types of energy used in buildings and how electricity may be conditioned
- Understand heating systems
- Understand cooling systems
- Understand domestic hot water
- Understand air handling and conditioning systems
- Understand lighting
- Review control systems for building equipment
- Understand renewable and low carbon generation systems producing heat and power such as solar and CHP
- Relate to how maintenance can impact energy management
- Identify and understand main applicable legislation such as MEES



## COURSES COVERING THE SPECIFIC ENERGY MANAGEMENT TOPICS TO GAIN AN IN-DEPTH KNOWLEDGE

### ENERGY AUDITING TECHNIQUES COURSE (1 DAY = 5 CPD HOURS)



Energy auditing is a relatively specialist skill but one that can identify and produce major savings in energy use and cost. While energy audits will always be specific to each building, this course provides the basic techniques and the key elements to look out for during an audit. The course describes the basic techniques of energy auditing, from initial data analysis through to the on-site process or equipment identification and operational review. It explains the main types of opportunities that are likely to be identified, the types of equipment that can be replaced or upgraded and will discuss the control of energy consuming process and equipment where much of the savings can be made. The course also covers the basic outcomes of an audit in relation to reporting and calculation of savings and return on investments.

#### Learning outcomes

This course will help you to:

- Understand the basic process for energy auditing
- Prepare and conduct an energy audit
- Scope and interpret site data before an audit commences
- Grasp auditing techniques that will be addressed for the systems below, but they can be applied to most energy consuming items:
  - » Heating systems
  - » Cooling systems
  - » Pumping systems
  - » Air handling systems
  - » Lighting
  - » Compressed air
- Identify appropriate control systems
- Gain understanding of basic reporting techniques
- Undertake basic calculation of savings and return on investment

“ It was informative, useful and given confidence to challenge quotes and suppliers.”

**Energy Efficiency Manager -  
Parkwood Leisure**

### MONITORING, TARGETING AND VALIDATION COURSE (1 DAY = 5 CPD HOURS)



This course introduces principles of monitoring, targeting and validating energy consumption. It is aimed at those needing an understanding of methods of gathering, using and interpreting data, as well as a range of available measurement technologies. The course is designed to give guidance on creating value and setting energy baselines and benchmarking, validating energy savings and ultimately using M&T to sustain energy savings.

#### Learning outcomes

The course will help you to:

- Define what monitoring, targeting and validating energy consumption mean
- Identify methods of gathering, using and interpreting data
- Understand a range of measurement technologies available
- Interpret data and create value
- Develop energy baselines and benchmarking
- Validate energy savings
- Use M&T to sustain energy savings

### ESSENTIAL HVAC CONTROL AND OPTIMISATION COURSE (1 DAY = 5 CPD HOURS)



Heating, ventilation and air conditioning (HVAC) systems are an essential part of most modern buildings and can consume a large part of any energy used. This course aims to inform participants about the most widely used form of HVAC, their basic control and potential methods for optimising their operation for the least energy use while maintaining the comfort within buildings.

#### The course also covers:

- Basic operation and control of systems such as boilers, air handlers, fan coil units, chillers, pumping systems and air conditioning and relate them to energy consumption
- Potential control methodologies

that can be used for optimisation such as speed, flow and differential temperature which can be used to optimise their use for lowest energy consumption while maintaining adequate temperatures and comfort levels. This will also include how many of these systems can be controlled via a BMS

- Implementation and correct use of variable speed drives across the range of HVAC systems
- The renewable versions of some of the HVAC equipment such as biomass boilers and heat pumps

#### Learning outcomes

This course will help you to:

- Understand the operation and energy use of the main types of HVAC
- Identify the standard control philosophies which tend to be used for the equipment
- Understand potential optimisation methods to reduce energy cost of HVAC and improve its performance Identify where to install variable speed drives on HVAC and optimize their use
- Control HVAC through systems such as a BMS
- Gain a basic understanding of biomass boiler use and heat pumps

### ENERGY PROCUREMENT COURSE (1 DAY = 5 CPD HOURS)



This course guides participants through the essential procurement processes for electricity and gas in the UK. It describes how the electricity and gas industries are structured, and how this impacts on the prices customers pay. It explains the main drivers of energy pricing in the UK and how electricity and gas tariffs are structured. It also explains the types of energy contracts that are available and the simple procurement processes that can be used by energy buyers. The course also includes information about how third-party intermediaries (TPI) work, how to get the best out of them, reveals how they get paid and how to minimise their cost.

#### Learning outcomes

This course will help you to:

- Describe the UK electricity and gas industry structures
- Understand what makes up delivered energy tariffs
- Identify what are the basic drivers of energy prices in the UK
- Understand the basic contract types available in the UK
- Formulate how to run a basic procurement exercise
- Understand what third party intermediaries do and how they get paid
- What third-party intermediaries do and how they get paid

### BMS ESSENTIALS, MONITORING AND OPTIMISATION COURSE (1 DAY = 5 CPD HOURS)



The aim of the building management system (BMS) is to guarantee the safety of building operation, while also

monitoring and optimising the use and efficiency of the building's electrical and mechanical equipment such as power system, lighting, and HVAC to assure efficiency. This course focuses on the essential aspects of BMS: what it is for, its suitability and integration, how to monitor its performance, how to optimise its functionality, how to build a business case for BMS.

#### Learning outcomes

This course will help you to:

- Understand what the BMS is and what it does
- Describe the below listed examples of the major subsystems controlled by the BMS and explain their integration:
  - » HVAC
  - » Central Fume Collection, Dust Collection System, Central Vacuum
  - » System, Heat blowers
  - » Steam Systems
  - » Hot Water System and Central Heating
  - » Chilled Water System
  - » Sprinkles System
  - » Electrical Monitoring System
- Identify how to make the most of your already installed system
- Apply structured approach to designing a strategy to drive all changes associated with BMS
- Draw connections between different types of stakeholders

- when integrating the system into the facility
- Build a business case for BMS

### UNDERSTANDING AND DELIVERING BEHAVIOURAL CHANGE PROGRAMME COURSE (1 DAY = 5 CPD HOURS)



This course not only provides participants with the knowledge of how to prepare and deliver a behavioural

change programme, but more importantly with an insight into the psychology of people and the way they behave which is essential in ensuring that any behavioural change programme is correctly structured and targeted in order to achieve a successful outcome.

#### Learning outcomes

This course will help you to:

- Understand why people behave the way they do, why people behave differently
- Grasp the psychology of persuasion, just how are we going to change people's behaviours?
- Identify the potential audience for change, who's going to make the biggest impact? Who will be your key allies?
- Identify your different options for a behavioural change programme
- Prepare a business case using tangible and intangible elements
- Gain approval to your proposal
- Plan how to make it happen, the key elements of delivering the programme
- Make sure that you are able to measure the success and report effectively on this
- Identify what next steps you should always take to ensure a successful completion to the current programme and setting the foundations for future programmes

### WASTE MANAGEMENT COURSE (1 DAY = 4 CPD HOURS)



This course has been designed to offer a comprehensive overview of waste management.

It focuses on waste legislation in the UK, waste disposal and recycling options. The course

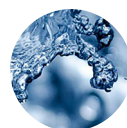
provides participants with all the essential knowledge of mapping waste streams, undertaking waste auditing, identifying improvement opportunities and setting SMART waste targets and KPIs, as well as measurement, monitoring and reporting techniques relevant to waste data. The course programme draws on established practices of organisational waste management and helps participants to develop more waste efficient practices.

#### Learning outcomes

This course will help you to:

- Understand the benefits of managing waste effectively
- Identify the key components of current waste legislation in the UK
- Understand what happens to waste when sent for disposal
- Formulate how to carry out a waste audit to help identify improvement opportunities
- Recognised how to set suitable waste targets that are SMART
- Measure, monitor and report waste data

### WATER MANAGEMENT COURSE (1 DAY = 5 CPD HOURS)



This course presents information about how the water industry is structured, how it works, how it prices its product

and what businesses may be able to do to reduce cost. It also informs participants about the opening of the competitive retail market in England from 2017 and any developments since the opening.

The course describes how water is metered and monitored and how to analyse consumption. It gives participants advice on carrying out a basic water audit, identifying likely areas of consumption and techniques that may allow reductions in water consumed. It also explains the link between water and energy use and identifies some techniques for raising staff awareness to help behaviour change towards water consumption.

#### Learning outcomes

This course will help you to:

- Understand the UK water industry structures
- Understand what makes up a



# ENERGY MARKET REPORT

**Weekly analysis of the energy markets:**

- Forward annual gas and electricity pricing
- Price drivers
- Outlook commentary

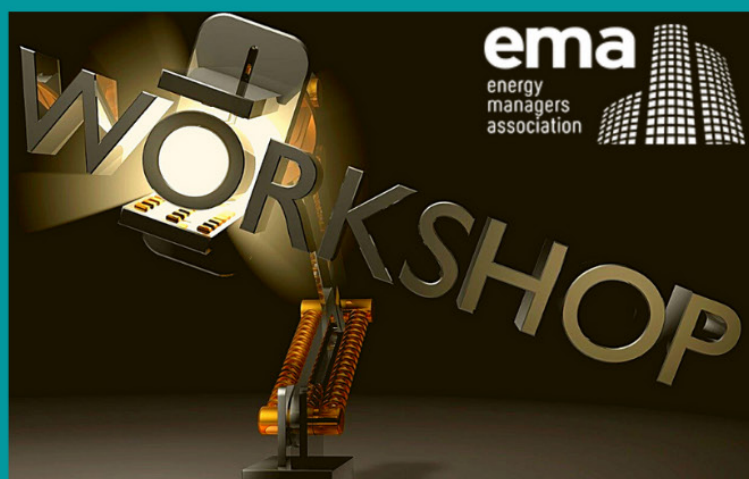


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<https://www.theema.org.uk/shop/>

## EMA ONLINE WORKSHOPS

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



### Upcoming Workshops:

- Energy Market Update: 2 June 2020, 11:00-12:00
- Energy Auditing Masterclass: 16 June 2020, 11:00-12:00
- What Is Net Zero and How Do You Measure It?: 24 June 2020, 11:00-12:00
- Energy Procurement Contract Types: 1 July 2020, 11:00-12:00

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

water bill

- Understand the opening of the English water market to retail competition
- Review water metering and monitoring systems
- Identify basic techniques on how to undertake a water audit and what can be done to reduce water consumption
- Relate water to energy consumption
- Identify techniques to change behaviour to reduce water consumption

### LIGHTING – BASIC UNDERSTANDING COURSE (1 DAY = 5 CPD HOURS)



This course provides an understanding of the lighting systems commonly found in the UK, their general uses

and guidance on how organisations can become generally more energy efficient with respect to lighting. The course is also aimed at helping people to engage at a higher level with lighting suppliers who may be presenting them with information. This can quite often be complicated and misleading, and this course helps participants to understand what may be presented to them.

#### Learning outcomes

This course will help you to:

- Understand basic measurements for lighting output and efficacy to help participants gain knowledge and be able to engage with lighting companies/suppliers.
- Identify and understand the common types of lighting currently found in the UK, their general uses and basic, pros and cons
- Understand the basic process for new lighting installations and upgrades with pictorial examples
- Understand basics of lighting design using free software to help participants be able to understand what information lighting companies may present them with
- Identify basic lighting control systems that can increase energy efficiency while maintaining required light levels and safe environments

### ON-SITE ELECTRICITY GENERATION COURSE (1 DAY = 5 CPD HOURS)



On-site generation of electricity can be a good way of reducing grid consumption but the varying technologies,

their suitability for implementation, income streams, ongoing costs and grid connection requirements can be complex and are different for every site. This course aims to inform participants about the main types of on-site generation and provide information on how to effectively deploy it and gain commercial benefit. It describes how the most common forms of on-site generation such as solar, wind and CHP can be specified, installed and operated, how to effectively size the generation, how they would connect within an existing site and the financial incentives and mechanisms available to each technology. The course also includes the process for applying for and obtaining permission from the local Distribution Network Operator (DNO) to connect any type of generation and to understand how to find out whether export provision may be available.

#### Learning outcomes

This course will help you to:

- Define the main technologies used for on-site electricity generation
- Identify the correct technology for deployment in a building
- Understand how to size the generation technology required
- Assess how and where to connect the generation technology
- Evaluate the financial incentives and returns available for each technology
- Recognise what may prevent on-site generation from being deployed
- Understand the process of dealing with DNOs to gain permission for generation and the possibility of exporting to the grid

“ Very helpful, targeted and specialised. A big help to my professional development. ”  
**Property Project Manager**  
**Field Studies Council**

### BATTERY STORAGE FOR BUSINESS COURSE (1 DAY = 5 CPD HOURS)



Battery storage has been the subject of a substantial amount of publicity and market interest recently. This

course provides a fundamental understanding of battery storage systems, the various battery technologies and their general use, how they can be deployed within buildings, charging and discharging methodologies, as well as looking at their limitations.

The course also looks at the financial incentives and electricity charge savings available, the energy contract type required to achieve savings and guidance on how to evaluate the benefits of battery systems in businesses. The course equips participants with the basic knowledge, skills and tools to consider integrating battery storage systems into their organisations.

#### Learning outcomes

This course will help you to:

- Understand how battery storage systems work and can be integrated into buildings
- Be able to identify whether battery storage is suitable for your use and would be allowed
- Be able to perform a risk and mitigation analysis
- Be able to review your electrical system, usage, charging and discharging cycles, current energy contract and define your objectives and targets
- Be able to use tools to review the cost modelling for battery storage and establish what variables may affect viability at your sites

### ENERGY MANAGEMENT STRATEGY AND PLAN COURSE (1 DAY = 6 CPD HOURS)



This course offers an overview of the key steps in developing an energy management strategy as part of the

organisational energy management practices. The key drivers and various approaches to setting the strategy are examined during the course.



The aspects of an essential energy management strategy: scope, baseline, targets and resources, achieving the target, monitoring, targeting and control, behavioural change, efficiency, reporting and reviewing are also taken into consideration.

### Learning outcomes

This course will help you to:

- Understand the key strategy drivers
- Review the organisation's energy use and requirements for its improvement
- Identify how to gain a stakeholder commitment and build business case
- Set targets, identify opportunities for improvement and setting an action plan
- Plan the implementation of the opportunities, report on the outcomes and review the strategy

### TURNING DATA INTO ENERGY SAVINGS COURSE (1 DAY = 5 CPD HOURS)



This course gives participants an opportunity to learn how to maximise the savings that can be

achieved from the effective use of energy data. Using real examples this course is designed to help participants to establish their data requirements and the different ways to deliver real measurable savings.

The course will cover:

- Sources of data
- What is data commonly used for, what else could it be used for
- How will you use your data within your business
- What do you really need:
  - » Displays
  - » Dashboards
  - » Reports
  - » Alerts
- Scoping data requirements
- The types & uses of metering devices
- Types of data analysis and performance indicators
- Identifying the opportunity
- Delivering the opportunity
- Real life examples

### Learning outcomes

This course will help you to:

- Make the best use of their existing data, turning it into deliverable savings
- Assess what additional data will genuinely help in achieving better results and how they would go about delivering this

### REGULATORY COURSES

#### SECR COMPLIANCE COURSE (1 DAY = 5 CPD HOURS)



Streamlined Energy & Carbon Reporting (SECR) extends reporting requirements to all large UK companies. This

course aims to inform participants about the background and requirements of SECR regulation, and give guidance on how to complete the process effectively within organisations.

The course examines the basis of the regulation, which companies need to comply, and the legal requirements. Material covered after the introduction helps participants to understand the processes needed to collect and report appropriate data, methodology, and the measures needed to be undertaken. Finally, the course guides participants on how to present the information to company decision-makers, auditors, and the Companies House.

### Learning outcomes

This course will help you to:

- Understand basic concepts contained within SECR
- Examine the scope of the regulations
- Identify data collection methods for energy, gas and transport
- Understand the creation and use of intensity metrics
- Describe the stated methodology used
- Define and scope energy efficiency principal measures
- Compile the report for auditors, Board of Directors, and the Companies House

“ The course gave me a lot of good ideas for improving our work for clients. ”

**Senior Engineer  
Sweco UK Limited**

### BECOME AN ESOS LEAD ASSESSOR COURSE (1 DAY – 6 CPD HOURS)



A step towards achieving the ESOS Lead Assessor status The Energy Savings Opportunity Scheme

(ESOS) regulation requires all large enterprises to carry out an ESOS compliant energy assessment every four years. Apart from the outputs from an ESOS energy assessment, ESOS also requires the assessment to be led and approved by an ESOS Lead Energy Assessor. The Become an ESOS Lead Assessor course provides participants experienced in energy management with knowledge to lead, review and approve an ESOS energy assessment.

What will the course cover?

- Energy assessment in context
- Defining an ESOS energy assessment
- Process of carrying out an ESOS audit
- Competencies of energy assessment team
- Analysing energy data
- Opportunities for improvement
- Communicating energy savings

### Learning outcomes

This course will help you to:

- Understand the ESOS Regulation and competencies described in PAS 51215: 2014
- Understand processes of leading, reviewing and approving an energy assessment according to ESOS
- Use data analysis as a basis to scope an ESOS-compliant energy assessment
- Use rules of thumbs to check and approve opportunities of improvement
- Understand techniques to maximise energy savings while minimising cost

**STILL UNSURE?  
THIS IS WHAT OTHERS SAID  
ABOUT OUR COURSES.**

“ I found the course extremely useful, and it greatly simplified the process of analysing critical plant and equipment, so that we can increase

effectiveness and hopefully reduce energy use.”

**Facilities Manager -  
Huntingdonshire District Council**

“ The course built on all aspects of previous knowledge and added a potential new skill that I did not have before attendance.”

**Energy & Environmental Manager -  
Celtic Manor Collection**

“ It was informative, useful and given confidence to challenge quotes and suppliers.”

**Energy Efficiency Manager -  
Parkwood Leisure**

“ Comprehensive, digestible and well structured.”

**Energy and Environment Advisor  
- Linklaters**

“ An engaging and useful course with relevant examples.”

**Waste Manager / Trainee Energy  
Manager - Kingston Hospital NHS  
Foundation Trust**

“ The course gave me some great ideas that I will apply at the start of the next financial year as part of my energy efficiency programme.”

**Central Operations Manager -  
Azzurri Restaurants**

“ The course was enjoyable, provided key ‘take away’ points and did what was expected.”

**Health & Safety, Technical and  
Training Manager - Bourne Leisure**

“ Very helpful, targeted and specialised. A big help to my professional development.”

**Property Project Manager - Field  
Studies Council**

“ Course was very informative. It covered the main areas I needed to learn about. Tutor was friendly and knowledgeable.”

**Performance and Monitoring Officer  
- Nottingham City Council**

“ Well structured, well paced, right depth.”

**Energy Manager - Tesco Stores Ltd**

“ Perfect for teams and job roles that need to start engaging on energy change programmes. Helpful to those that need reminding how best to interact with teams and getting the best out of them and perfect if you’re genuinely interested in the human psyche.”

**Energy Communications and  
Compliance Manager - Marks and  
Spencer**

“ Opportunity to speak to participants from the same industry and relevant to projects I am running.”

**Energy Manager - Britannia Hotels**

“ The course gave me a lot of good ideas for improving our work for clients.”

**Senior Engineer - Sweco UK Limited**

“ A well-structured and delivered learning opportunity. Concise and applicable content. Excellent knowledge transfer and applicable tools, techniques and methodologies.”

**Head of Purchasing & Contracts  
- Metroline**

“ Pitched just right – not too basic / not too complicated. It given me the confidence to place high value contracts. Small class gave each member the opportunity to raise queries.”

**Group Accountant – Lake District  
Hotels Ltd**

**For more information please visit  
[www.theema.org.uk/ema-energy-management-in-practice-training-programme-lec-stage-3/](http://www.theema.org.uk/ema-energy-management-in-practice-training-programme-lec-stage-3/)**





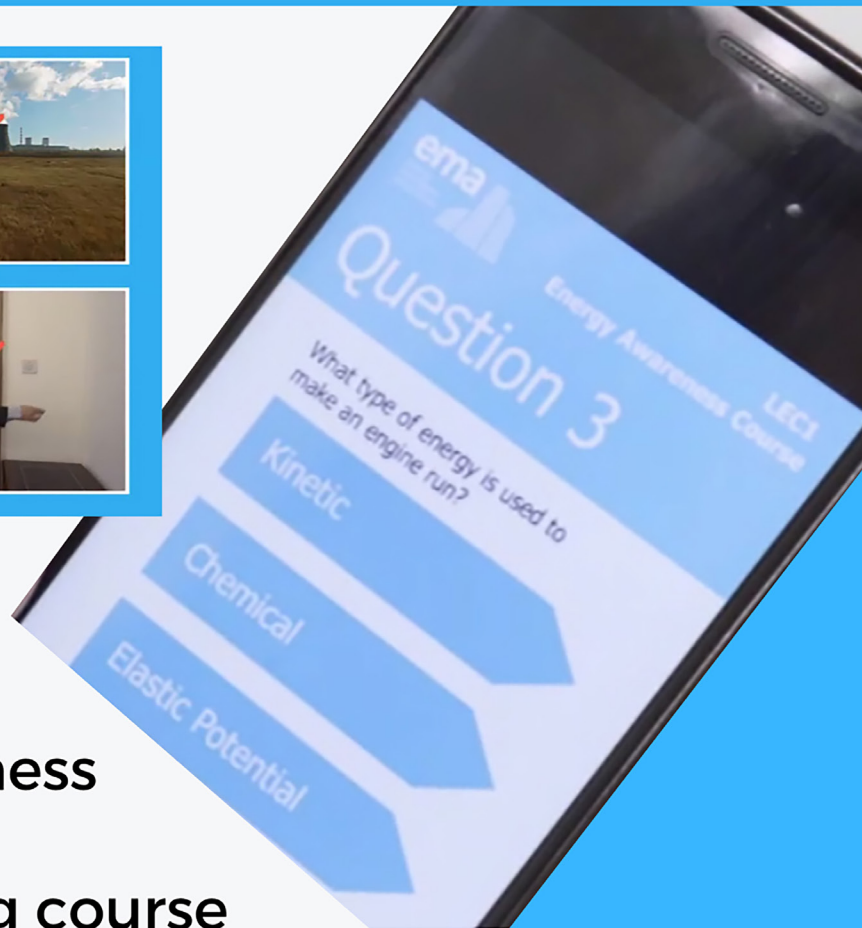


**AVAILABLE ONLINE**

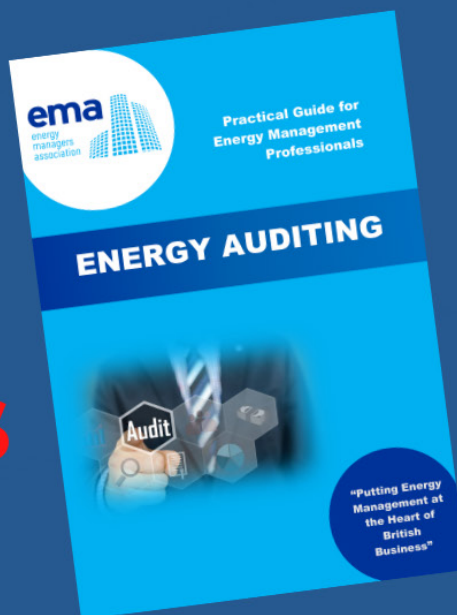
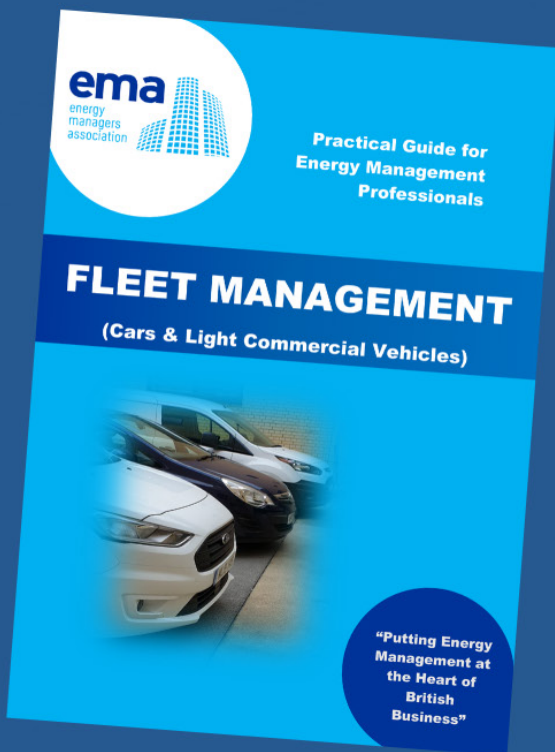
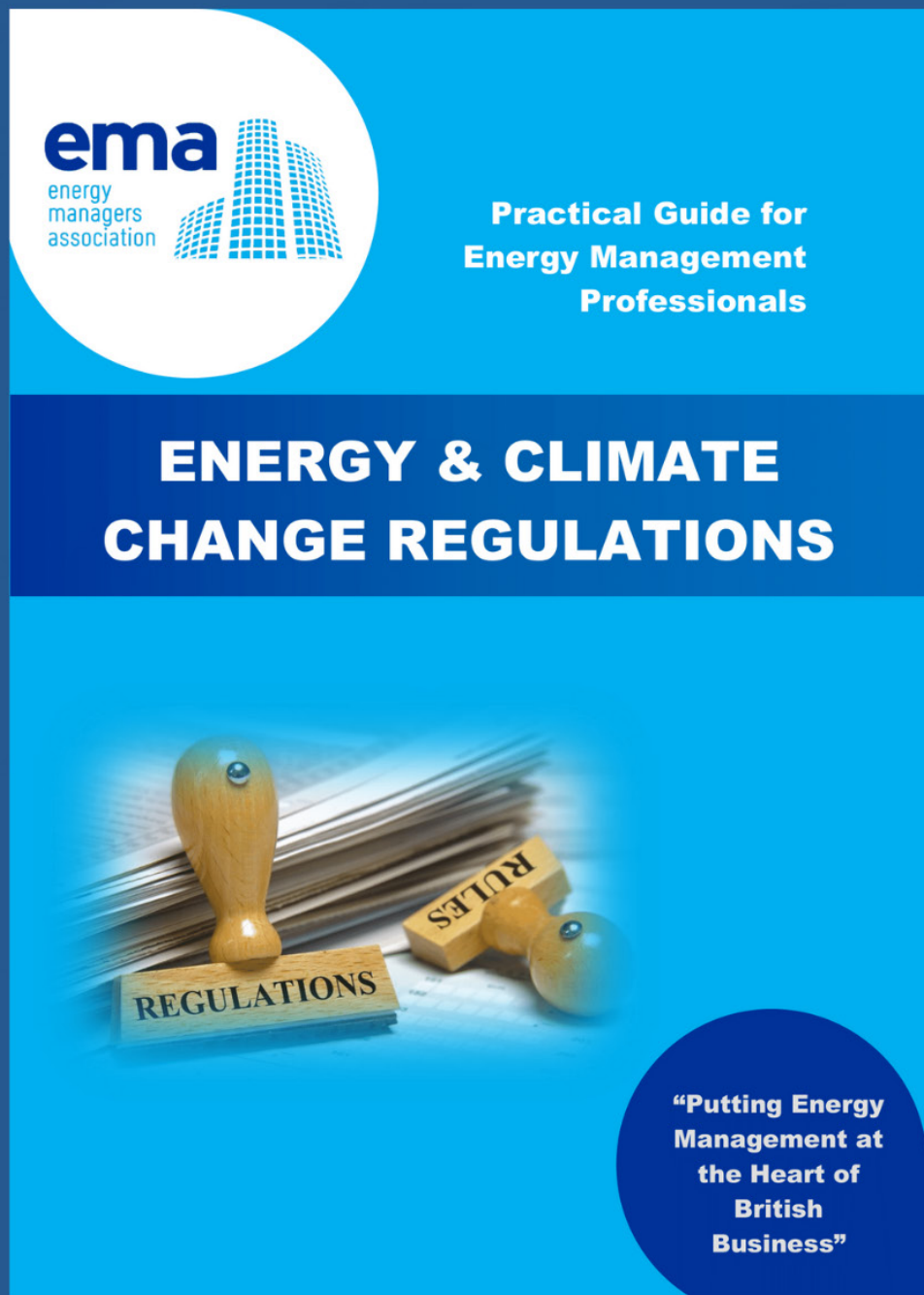
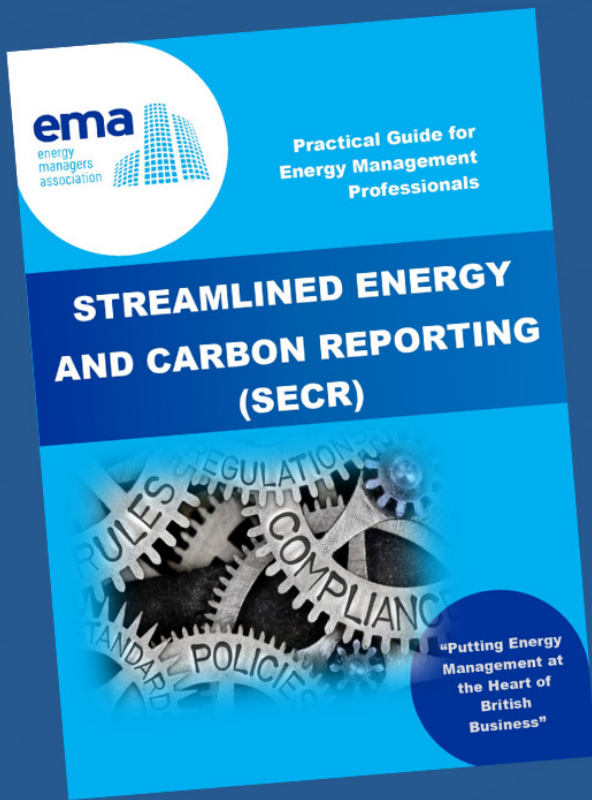
## Energy Awareness Course LEC 1



- Reduce energy bills
- Raise energy awareness
- 25-minute e-learning course with a multiple answer quiz



**FOR MORE INFORMATION ABOUT THE EMA  
ENERGY AWARENESS E-LEARNING COURSE,  
CONTACT [JANA.SKODLOVA@THEEMA.ORG.UK](mailto:JANA.SKODLOVA@THEEMA.ORG.UK)**



**RESOURCES  
AVAILABLE**

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## ENERGY & CLIMATE CHANGE REGULATIONS



**"Putting Energy  
Management at  
the Heart of  
British  
Business"**

**Organisations these days (particularly large undertakings) have a plethora of legislation they must comply with, such as the General Data Protection Regulations (GDPR). Among these, are a raft of energy and climate change regulations. It can be difficult to keep up to date with all the various legislation. Particularly, given the constantly developing and evolving nature of energy legislation.**

Following discussions with various organisations, we discovered that they initially find it difficult to determine which legislation they qualify for and subsequently struggle to ensure compliance in a timely manner. They also find it cumbersome to have to comply with multiple overlapping legislation increasing the administrative burden. As such, potentially valuable exercises such as the identification of energy saving opportunities, under the Energy Savings Opportunity Scheme (ESOS), can be treated as tick-box exercises, and therefore, minimising the value of data collection and undertaking energy assessments. This can create an impression of legislation not being valuable to the business, creating a cycle of just doing the bare minimum to ensure compliance.

The EMA Guide to Energy & Climate Change Regulations details the various energy and climate change regulations, legislation and relevant economic incentives. It allows energy managers to make sense of these and applying them to their organisations in order to get the best value and ensure compliance.

**The Guide is available on the EMA website and includes sections on:**

### **OVERARCHING LAW: EUROPEAN & UK**

- EUROPEAN LAW
- ENERGY EFFICIENCY DIRECTIVE
- ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE
- RENEWABLE ENERGY DIRECTIVE
- NON-FINANCIAL REPORTING DIRECTIVE
- UK LAW
- CLIMATE CHANGE ACT 2008
- ENERGY ACT 2013

### **PASS-THROUGH CLIMATE CHANGE OBLIGATIONS**

- CAPACITY MARKET (CM) CHARGE
- MONTHLY TRIAD CHARGE
- DISTRIBUTOR USE OF SYSTEM CHARGES (DUOS)
- RENEWABLES OBLIGATION CHARGE (ROC)
- BALANCING SERVICE USE OF SYSTEM (BSUOS) CHARGE
- FEED-IN TARIFF CHARGE (FIT)
- CONTRACTS FOR DIFFERENCE (CFD) PAYMENT
- CLIMATE CHANGE LEVY (CCL)

### **CARBON REDUCTION COMMITMENT (CRC)**

### **EU EMISSIONS TRADING SCHEME (EU ETS)**

### **ENERGY SAVINGS OPPORTUNITY SCHEME (ESOS)**

- ABOUT THE ENERGY SAVINGS OPPORTUNITY SCHEME (ESOS)
- COMPLIANCE VERSUS BEST PRACTICE
- THE BENEFITS OF ESOS
- HOW TO MAKE THE MOST OF ESOS

### **STREAMLINED ENERGY AND CARBON REPORTING (SECR)**

- ABOUT THE STREAMLINE ENERGY AND CARBON REPORTING (SECR)
- HOW TO MAKE THE MOST OF SECR

### **NON-DOMESTIC MINIMUM ENERGY EFFICIENCY STANDARDS (MEES)**

### **HEALTH & SAFETY**

- CONSTRUCTION DESIGN AND MANAGEMENT REGULATIONS (CDM)
- PROCESS SAFETY & MANAGEMENT OF CONTRACTORS

### **ECONOMIC INCENTIVES**

- CLIMATE CHANGE AGREEMENTS (CCAS)
- FEED-IN TARIFFS (FIT)
- RENEWABLE HEAT INCENTIVE (RHI)
- ENHANCED CAPITAL ALLOWANCE (ECA)

### **RELEVANCE OF THE LEGISLATION / REGULATION TO DIFFERENT SECTORS**

### **LONG-TERM 2020, 2030, 2050 DIRECTION OF LEGISLATION**

- BROAD CHANGES THAT MIGHT AFFECT LONG-TERM COMPANY PLANS

[www.theema.org.uk/ema-guides-to-energy-management/](http://www.theema.org.uk/ema-guides-to-energy-management/)



# Financing Energy Efficiency Projects

**Successfully funding energy efficiency projects and delivering them remains one of the biggest frustrations for Energy Managers, regardless of their organisations balance sheet. Even cash rich organisations can still decline great projects and business cases because they are deemed non-core business. However, with the recent refocusing on Climate Change and the Net Zero ambitions of Governments and businesses, the tide continues to turn in our favour. Furthermore, there are a growing number of new and different financing options and strategies available to Energy Managers and businesses outside of the traditional internally funded route. Over the last few years, we've seen a number of banks, investment vehicles and energy service companies come to the market with new and compelling propositions, and not just with a cheque book, but with a service wrap that streamlines the overall project approach and adds value.**

What I have outlined in this article is an overview and some of the considerations and options for funding model alternatives, as well as re-covering some of the basics that are essential to getting any project off the ground. Whilst we are unfortunately in lockdown for Covid-19, maybe now's the time to look at your project list and see how you could structure an investment strategy that sees your projects come to fruition.


## Getting the basics right

Successfully funding a project isn't all about the numbers. Clearly every project needs to be fully and accurately costed, ideally with firm quotes for the hardware, labour, maintenance, access, health and safety, project management, and subscription costs (projects with a SaaS element) to name a handful. Other considerations include using an agreed and robust energy unit rate and compliance cost forecast as well as understanding the future strategy of the building(s) that the project is to be installed in. This is important when considering longer paybacks to ensure the project can payback over the expected

lifetime of the building occupancy. Once the above is understood then simple payback figures along with the Internal Rate of Return (IRR) can be calculated. These are key when discussing the project with any finance team, either internally or externally and each will have their own view on what returns will enable them to fund a project.

But the numbers are only one part of it. I've found that the stakeholder management and positioning of the project in the early days are vital to its success and avoiding wasted time. For example, I've learnt the hard way and seen 6 months of hard work on a multi-million-pound Power Purchase Agreement fall at the last hurdle because the Chairman wasn't for it, something we could and should have found out early on. Conversely, I've had the best results when fully engaging all the impacted stakeholders from the start, building an overall capital plan forecast where it is fully understood what the operational touch points and dependencies are, along with the overall headline value and benefits. It is therefore crucial from the outset to understand your stakeholders, the impacts of your projects on them and how to manage the story for each, as





they won't necessarily be the same.

### **Funding & delivery options**

I won't go into internally funded projects because if you are able to get the above basics right, it will come down to a business decision as to whether the business is in a position to run with it or not. What I will cover are a couple of the other options you may wish to consider if internal isn't an option; partnering with an Energy Services Company (ESCO) or a Bank / Investment company specialising in energy infrastructure investments.

These days ESCOs come in different guises and have a range of different propositions ranging from the traditional ESCo model of supplying,

installing and managing large energy plant (CHP for example), to Facilities Management (FM) providers providing blended contracts that not only fund investment in projects, but also provide operational improvement works alongside so you can get the best from both worlds. I've worked closely with these and they can work exceptionally well. Essentially you can combine an Energy Performance Contract that not only provides capital investment for energy efficient equipment but also optimises the wider energy consuming equipment across the portfolio. For example, capital funding from the ESCo/FM is used to replace lighting and air conditioning equipment or upgrading building management systems alongside a commitment over 3-5 years to continue to optimise energy. Depending on the age of equipment being replaced and its performance savings in excess of 10% can easily be realised.

The above ends up being an outsourced energy model, usually working in conjunction with the businesses' FM provider. It's a model that I've successfully delivered very large savings from and works well for lower capital values (<£5m). It shows that FM providers are widening their service offering and moving into

the ESCo space. Approaching your FM provider in the first instance and discussing something like this is a good and natural alternative next step to internal funding as they are already working in partnership with the business and can potentially wrap this into a wider contract. Considerations must be given to the size and shape of the portfolio, the future business strategy relating to buildings and the contractual risk that each party takes. The FM provider (and any 3rd party investor) will not want to invest in a building that could close before the project finishes paying back without protection from the business to cover any outstanding capital. As I've said above, this works well for lower capital value projects, usually where you can combine smaller, lower risk projects such as lighting, HVAC and BMS upgrades across the portfolio into an overall project value that's less than £5m. The limit ultimately becomes the FM / ESCo's balance sheet.

For larger projects, either one-offs or higher value multiple projects (>£10m) this is where a Bank or dedicated Investment Company specialising in green projects comes in. These have developed from a pure loan product to become vehicles for mobilising large amounts of capital and include a growing green bond market. To this end, the service provided by these companies starts to look very much like an ESCo, providing services from project concept, through to technical assessment, due diligence and delivery. Often these companies will have selected partners that ultimately provide an end to end solution and can bring all this to the table for the customer. A good example of this is a large manufacturing business who had the ability and desire to install large scale battery storage (50MW) on its manufacturing sites. Whilst it was primarily for site resilience, they could also see the potential for deriving new revenue streams from the balancing market. However, the company didn't want to spend the large amount of capital required to install and manage this. The solution was developed and driven by the Investment Company and involved a battery manufacturer, a software solution company specialising in demand side response, the local FM provider and the Investment Company. Collectively, a proposal was put to the customer that provided new resilience through battery storage

with only a minimal opex spend. Whilst the direct returns to the end customer may not be as large as direct internal funding, this option provides a way and means of asset and infrastructure investment into a customer's portfolio. It almost sounds too easy. It isn't that complicated, however, there remains a need for commitments and guarantees from the customer in terms of site access and use and re-imbursement should the project end before its term. This ultimately again then comes down to overall business perception of risk and where a project like this fits in with the overall business strategy and more specifically its energy and carbon strategy. Nevertheless, the market has evolved to provide this as a very viable option and can be used as a comparator alongside the internal funding option. Sometimes putting the two together on the table next to each other can push a decision back in favour of the internal route!

### **A final note**

One point I've not covered in the above, valid for all options, is the Measurement & Verification (M&V) that's required. This is vital, more so for the external funding route, and I would thoroughly recommend recruiting an independent 3rd party to undertake this role to ensure that the project delivers what it should and to demonstrate the overall benefits. This would certainly be mandatory for a 3rd party investor option. The International Performance Measurement and Verification Protocol (IPMVP) has existed for over 15 years and is there to provide the transparent measurement and recording of energy conservation measures and projects and there are a number of organisations providing these services. It certainly provides piece of mind if large energy savings claims have been made and businesses are then asked to pay providers for their share of the savings.

### **Author's profile:**

Paul's worked in Energy and Sustainability for over 20 years, for the likes of O2 and Lloyds Banking Group and many others as Commercial Director for Mitie's Energy Services business. A former EMA board member, Paul recently founded FourCornerGlobal, an independent consultancy working in the Energy and Smart Cities space.



# What Not to Do... In Waste Management

**Energy management professionals usually define themselves as 'wearing many hats', which makes the profession interesting and dynamic but also requires an all-round knowledge and experience in key subjects. Whilst there is a plethora of information available out there in each topic, there are only so many hours in the day that can be devoted to reading and research.**

Have you ever wondered what is the one thing that you should avoid doing when looking for a new supplier, undertaking a waste audit or setting energy management goals? The EMA will be looking at key areas of energy management and asking those who focus on those areas at their organisations. In the last issue, we tackled what not to do in energy procurement and in this issue, we have focussed on waste management.

emotions about bad practice you see stop you from seeing the good practice. It's easy to get into a very negative mindset when auditing but to engage effectively with staff you should sandwich criticism between praise and encouragement. Don't shout at people (however much you may want to) - find a better outlet for your frustration away from the situation, we need to keep people positive about good practice.

**When setting waste targets,** you should never ever go too big or too small with your goals. Aim for something achievable but challenging. This way it will feel like an achievement if you get there (unlike an easy target) and won't be impossible.

**When structuring a waste management strategy,** you should never ever write it for you. I might find a long, complicated document satisfying to produce but it's easy to lose focus on how this document will serve my organisation. Keep it short, easy to read and useful to the people

**Paul Graham – Utilities, Waste and Sustainability Manager at Kingston Hospital NHS Foundation Trust**

**When mapping waste streams,** you should never ever take people's word for what happens to each stream. It's much better to follow the waste through the process and observe the whole thing.

**When undertaking waste audit,** you should never ever let your





you want to read it. Use relevant illustrations and charts to break up text, make your core messages clear and try to establish a flow of ideas across the whole document so people get your big idea or theme by the end and come away knowing what they can do to make it happen. Check in with the senior management team to see what they want to prioritise.

**When measuring waste data**, you should never ever think you can capture everything or that everything is worth capturing.

Only gather data that is actually useful and can be collected without excessive resourcing. Ask: 'Will the data you want to collect enable improvements to services or costs?'

**When reporting waste data**, you should never ever use over-optimistic assumptions, especially on recycling. Assuming that all the bulky waste in your skip is recycled or that 100% of the material in your mixed recycling scheme is recycled may come back to bite you. Most suppliers can

provide average proportions for their disposal facility, if not for your waste specifically. It's sometimes better to under-state than to have to write-down your recycling rates in the future because your assumptions were wrong.

**When choosing a waste service provider**, you should never ever not visit their disposal sites before sending them your first batch of waste.

In healthcare, we are always encouraged to check up on what happens to our waste. Regular visits can seem like a bit of a chore but it's one of the easiest ways to maintain compliance with the Duty of Care regulations. It can also be quite interesting to see how sites develop over time. We're seeing a lot of interest and innovation in waste at the moment and it helps keep you up to date with what your suppliers are doing.

**When procuring for multiple sites or as a collaborative partnership with other organisations**, you

should never ever assume all sites will receive the same price (unless you specify in the tender that prices should be averaged across them all).

Waste is more complicated than you think and it's important to specify up front what you want from the service. Is it just collection from a single point per site, do you need them to include moving waste around the site or collecting from multiple areas within a site, do you expect an onsite presence, training, monitoring/auditing, etc.

You may wish to do a more Competitive Dialogue procedure following the award where the best solution for each site/organisation is worked out in collaboration with the supplier. Otherwise, you should spend a lot of time and energy before the tender to define the exact service you want/need and what elements are a must have, should have or nice to have. There are many variables and you can either specify all of them up front or be ready for a lot of back and forth clarifications.



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**Ethan O'Brien, Group Energy Manager at Klöckner Pentaplast**

**When mapping waste streams,** you should never ever forget about the intangible waste streams in any organisation. The true cost of waste is not just the cost of taking it away. It's often buried in processes, practices and time that create waste in the first place. Use Lean Six Sigma tools and Value Stream Mapping to think about waste in its widest sense.

**When structuring a waste management strategy,** you should never ever think that anyone – at any level in an organisation – is too small or insignificant to make a difference.

Waste management is a particularly iconic, visible and tangible example of the impact businesses and people

have on the planet. Engaging your people can make all the difference. Individual change becomes a catalyst for discussion and promotes change in others. For the doubters that remain, ask them why they think improving productivity is a bad idea.

**When implementing a waste management plan,** you should never ever fail to connect two operations that are usually distinct – procurement of waste contracts and managing their ongoing delivery.

Typically, managers in the procurement part of the organisation focus on buying services at the lowest possible price; whereas sustainability managers elsewhere are working to reduce waste and improve efficiency. Coordinating both activities can save money, reduce risk and improve overall outcomes.

**Anita Leite, Estates Energy and Waste Officer at West Suffolk NHS Foundation Trust**

**When setting waste targets,** you should never ever do it without having a way of calculating/showing your progress. In many hospitals (in my area of expertise) it is common that targets are set without having a way of checking the progress.

**When structuring a waste management strategy,** you should never ever make it too long and complicated.

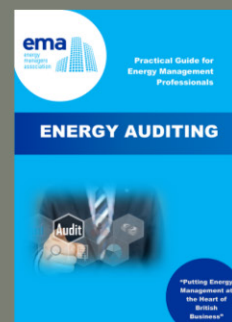
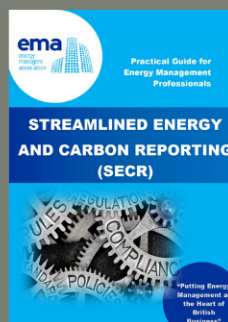
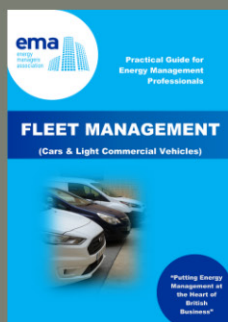
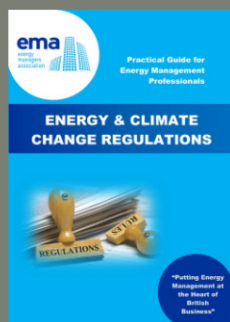
It is normal that the person writing it is the one with the best knowledge regarding that subject. This could turn the strategy very hard to understand for people that are not expert on that. The strategy should be simple and easy to understand by everyone, otherwise it will be harder to implement it.

**When measuring waste data,** you should never ever forget to introduce the assumptions that were made and the boundaries.

The strategy, the data collection, the waste policy must have a boundary and scope. You need to know where that data comes from and what is included.

**When choosing a waste service provider,** you should never ever forget to ask how they will share and collect the data you need.

As a waste manager it is important that you have data regarding how much waste is collected and where does it go. Some companies are very bad on sharing data the way that you need.



[www.theema.org.uk/ema-guides-to-energy-management/](http://www.theema.org.uk/ema-guides-to-energy-management/)



## ENERGY MANAGEMENT ONLINE TRAINING SCHEDULE 2020

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JUNE	2 <sup>nd</sup>	Waste Management
	3 <sup>rd</sup>	Energy Auditing Techniques
	4 <sup>th</sup>	Understanding and Delivering Behavioural Change Programme
	9 <sup>th</sup>	Energy Procurement
	25 <sup>th</sup>	SECR Compliance
JULY	9-10 <sup>th</sup>	Fundamentals of Energy Management
SEPT	17 <sup>th</sup>	SECR Compliance
	24 <sup>th</sup>	BMS Essentials, Monitoring and Optimisation <sup>NEW</sup>
OCT	1-2 <sup>nd</sup>	Fundamentals of Energy Management
	8 <sup>th</sup>	Energy Procurement
	13 <sup>th</sup>	Water Management
	14 <sup>th</sup>	Understanding and Delivering Behavioural Change Programme
NOV	4-5 <sup>th</sup>	Energy Management in Building Services
	10 <sup>th</sup>	Lighting Basic Understanding
	19 <sup>th</sup>	Essential HVAC Control and Optimisation
DEC	3 <sup>rd</sup>	Energy Auditing Techniques

Please note that all courses will be delivered online on the scheduled dates until further notice.

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All courses can be delivered to teams or groups of stakeholders from the same organisation or industry in a standard format, or as tailored sessions (minimum 6 candidates). For a quote email [jana.skodlova@theema.org.uk](mailto:jana.skodlova@theema.org.uk) with your chosen course title and approximate number of staff. We can also develop new, bespoke material to fit specific client needs.

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"The course has been very helpful to me in improving my understanding of building services. It will help me to identify potential energy savings in the Council's corporate buildings. It will also allow me to understand more in my dealings with building managers, contractors and consultants."

Energy Project and Programmes Officer, Islington Council

"An engaging and useful course with relevant examples."

Waste Manager / Trainee Energy Manager, Kingston Hospital NHS Foundation Trust

"Very helpful, targeted and specialised. A big help to my professional development."

Property Project Manager, Field Studies Council

"The course gave me a lot of good ideas for improving our work for clients."

Senior Engineer, Sweco UK Limited



# The Difficult Decisions Around a Low Carbon Lifestyle

**Climate Change is constantly in the news whether its protests, rivers flooding more often and storms hitting us every other week, people are starting to make serious decisions about the choices they make. This might involve using a bike instead of taking the car, upgrading the house with Solar PV or taking less flights in a year. However, the choices are not always this easy to make and we are not always given the correct information with which to make the right decision.**

I have an example of this in my own life. The other month I took my car into the garage and when I went to collect it, I was presented with a long list of items that needed addressing. Consider that my car is 10 years old and has travelled nearly 250,000 miles it would have been an easy decision to buy a newer one, after all it is often easier to get a loan for a car than it is to fork out for the repairs with your own cash. I actually opted to get it fixed, the problems were mostly suspension related and now it drives like new, time will tell if I made the correct decision or not but I will have more than covered the costs if it lasts one more trip around the world.

The decision I made was based upon the following considerations. If I change my car, the chances are that my existing car will get scrapped or that someone else might buy it, fix it and get valuable miles out of it. Consider also part of the reason that we are in the mess we are in is because we buy too much stuff which later ends up in the scrap yard or in land fill. I did consider replacing my car, but the choices really aren't easy, electric would have been my first choice but for me it is too expensive and unsuitable for the distances I travel, also there are further issues around the current infrastructure. The next choice would have been petrol or diesel, however, given that we do not know how future legislation changes may affect where I can use the car or if changes in legislation will devalue it, then this is also a risky decision. Better to have a car that has little value than to spend good money on a newer car only for it to become valueless a year later.

I also did some research. My car has a range of 500 mile on a tank of fuel that weighs 50 Kg when full. The energy density of diesel is 10 kWh per Kg, depending on what publication you read, compared

with this the energy density of a lithium battery is 0.254 kWh/kg, this means that an electric car with a range that compares with my own will have a battery that weighs more than 1000 kg. Note that I have also taken into consideration that the transfer of energy with a diesel car is only 40-45%. I did have a look at various manufactures specification to try to find out what the weight of the batteries are, but it's actually quite difficult to find as it is buried quite deep down in the small print. However, I did find some information that correlates roughly with my own calculations.

My conclusion is that powering our vehicles via batteries is not really a good use of energy, just carry a bag of sugar up the stairs and then try the same thing with 2 bags of potatoes (maybe 3 or 4 perhaps). A new trend to keep fit, perhaps?

There is a third way, hydrogen fuels cell. Hydrogen is the most abundant element in the known universe and the lightest. The energy density is 33.3 kWh/kg, 3 times that of diesel and 131 times that of batteries. Hydrogen can be generated from water using electrolysis and when used in a HFC the end product is





water. Some early adaptors are South Korea, parts of North America and Japan. In the UK Hydrogen is one of the Governments 2050 low carbon strategies and in 2017 the Government announced a £23 million fund to accelerate the uptake of hydrogen fuelled vehicles and new hi-tech infrastructure. In 2020, London will have the first Hydrogen powered double decker buses.

According to TFL, the buses will run on green hydrogen produced by North Kent Offshore wind farms. As well as these buses, single decker hydrogen buses operate in Aberdeen and Brighton. It's easy to see the appeal of hydrogen fuelled cars, they emit nothing but water and have long range. As the challenge to get us out of easy to use combustion engine cars and into EV's becomes clear, might fast fill hydrogen become a better zero emissions bet?

Cost has always been a big drag with the cost of a hydrogen fuel cell, typically being 10 times higher than an electric equivalent, but costs will come down. The third generation Toyota Mirai will have a fuel cell that costs similar to current hybrids. Infrastructure is also an issue, the UK currently has only 12 filling stations, and there are also safety

concerns. In South Korea, recently residents' groups are opposing the construction of new fuelling stations following an explosion at a Hydrogen storage tank in the city of Gangneung, killing two people. Even if these issues are ironed out, it could be said that hydrogen lost to Lithium iron a long time ago as an automotive fuel. The amount of cost committed to the lithium iron supply chain excluding charging infrastructure is roughly 10 times that being committed to hydrogen making the lithium iron industry 'too big to fail' over the next 10 to 15 years. In the meantime, it's likely that hydrogen will fill in niches where EVs cannot compete such as high mileage commercial vehicles that cannot afford to be waiting around idling at charge points.

At the moment, the supply of lithium is matching demand, but over the next decade production will start to lag behind the resources required for our electric cars and consumer electronics, so we are likely to see the same geo political tensions as we have already witnessed with oil. In China and Bolivia, lithium extraction has already caused pollution in rivers. In the Salar de Atacama in Chile, part of South America's vast 'lithium triangle' of high-altitude lakes and

salt flats, more than 1,700 litres of lithium brines are pumped from the shallow subsurface every second. This intense activity in one of the driest areas in the world is causing serious friction over water rights between local communities and mining companies and is putting huge pressure on a fragile and poorly understood ecosystem. Are we going to replace our addiction for fossil fuels with an addiction to Lithium? Hydrogen could be the answer.

In conclusion, I don't think it is the best idea in the world to lug billions of tonnes of batteries around the country in our day to day commutes, however batteries have a use. Coupled with renewables such as wind and solar, they allow energy to be stored when there is less demand so that it can be used to buffer the grid during periods of peak demand. Cars being charged from the grid using intelligent chargers (car to grid) and smart grid technology could provide this grid buffering solution. As batteries in the current generation of electric cars come up to replacement it is possible that these batteries can be further used to buffer the grid or provide backup household resilience. Therefore, batteries in vehicles should be seen as a transient technology which will not only get us from our current thirst for fossil fuel but will also help solve issues around storage of excess renewable energy and allow our current infrastructure cope with more demand.

Will I change my current car? Eventually I will, but I will need assurances, I want to be sure that the solution is not only right for me but also the one that is right for the whole world.

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#### Author's profile:

Jonathon has a background in Electrical and Electronic Engineering and currently works as an Energy Manager for MITIE energy. He has 16 years' experience of trouble shooting SCADA systems (supervisory controls & data acquisition system) for major clients in the UK and around the world, prior to a career in building services consultancy and finally Energy Solutions management.



## CASE STUDY



# ACCO Brands Improves Energy Efficiency

**Acco Brands UK, the world's oldest pencil manufacturer, effectively reduced power consumption and improved energy efficiency with ISO 50001 certification.**

**ACCO Brands UK achieved certification to ISO 50001 in June 2019 – the international energy management standard that aims to help organisations continually improve their energy performance and in turn reduce energy costs and greenhouse gas emissions.**

**Certification covers five ACCO Brands UK sites, including The Cumberland Pencil Company in Lillyhall and Keswick, the distribution centre in Halesowen and offices in Aylesbury and Uxbridge.**

### Background

All five ACCO sites had previously been successfully audited under the Energy Savings Opportunity Scheme (ESOS) Regulations 2014, which required all large businesses in the UK to undertake mandatory assessments of energy use and efficiency opportunities at least once every four years. It was considered to be a naturally more progressive and dynamic process to seek ISO 50001 certification, as it could be dovetailed with the ISO 14001 and 9001 certifications already in place at all sites.

All of the latest versions of ISO standards are based on the high-level structure Annex SL, so therefore are designed to integrate with each other, a key benefit to organisations that are approaching multiple standards at the same time or have

already experienced certification in at least one. All share an effective Plan-Do-Check-Act (PDCA) model.

SGS United Kingdom Ltd had already been ACCO Brands' audit partner for a number of years, working across 34 locations in the EMEA region and in Shanghai. Rob Ponne, Vice President Procurement and ISO Programme Manager ACCO Brands EMEA, claims that having SGS as auditing partner engenders additional credibility with customers and other stakeholders.

### Implementing ISO 50001: the process

A board-led, company-wide commitment to sustainability, five years of systematic energy reduction and familiarity with the requirements of achieving ISO certification made preparation for and passing the audit relatively straightforward.



Mark Wilkinson, Regional Vice President, UK and Ireland commented: *"Local management teams at all sites were crucial to delivering the practices and processes that lead to successful certification."*

The audit itself took place over five days across the five UK sites. Rob Ponne, Vice President Procurement and ISO Programme Manager ACCO Brands EMEA, recalls that the concerted and successful programme of energy performance improvement – supported by accurate documentation and an ingrained culture of sustainability.

Ponne says: *"Each site maintains a 'storybook' evidencing how it uses and manages energy, plus we have an overarching manual, all of which were used in the audit."*

*"Our ACCO Brands colleagues in Germany had been certified in 2016 and we also called on their experience in preparation."*

*"We did not receive any non-conformances, but did get some observations and improvement opportunities, which we are actively managing."*

### ISO 50001: the benefits

As if there were not already a robust sustainability culture across the business, certification to ISO 50001 has provided formal recognition to both employees and supply chain partners. It has also lent further impetus to an ambition to reduce energy consumption by 10% over five years.

Barbara Murray, Technical Manager Operations at the Cumberland Pencil Company in Lillyhall: *"In the Cumberland Pencil Company, we have reduced daytime lighting power consumption by replacing solid roof panels with rooflights. The biomass boiler use also makes a positive impact on gas consumption, but we know we can get smarter still with further production process improvements."*

Carl Woods, European Technical Service Director at the ACCO Brands

warehouse in Halesowen: *"For Halesowen we have installed a new gas boiler and managed to reduce the m2 usage by improving working processes."*

Lee King, Director of Health and Safety at the ACCO Brands office in Aylesbury:

*"We have considerably reduced power consumption at Aylesbury by drastically reducing the number of servers, moving a lot of data into the cloud. This is from not only the servers themselves, but the air conditioning needed to cool the racks. But again, we are going to improve this even further by looking at our uninterruptible power supply cooling."*

Plans also extend to the company's vehicle fleet in terms of introducing more low-emission models, which would have the additional benefit of lower running costs.

Previously, under ESOS, the focus was on headline figures, with big energy-saving projects requiring return on investment within two years. ISO 50001 has enabled the company to drill down to more granular savings, that combine to make the bigger savings it needs to achieve its goals and continually improve energy performance.

Energy reductions are included in ACCO Brands EMEA 'Taking Care of Tomorrow' annual sustainability report.

### Author's profile:

Terry has over 10 years' experience auditing Environmental Management Systems with SGS, working with leading organisations to gain significant knowledge and experience in energy management across a variety of industry sectors.

### ISO 50001 implementation

ISO 50001 supports organisations in all sectors to use energy more efficiently, through the development of an energy management system.

ISO 50001:2018 provides a framework of requirements for organisations to:

- Develop a policy for more efficient use of energy
- Fix targets and objectives to meet the policy
- Use data to better understand and make decisions about energy use
- Measure the results
- Review how well the policy works
- Continually improve energy management

If your organisation is already certified to the latest version of a number of ISO standards, much of the work necessary for auditing and certification will already be in place.



# Future Proof Your EV Charging Station

**The UK government is consulting to bring forward its 2040 plan to ban selling new petrol, diesel or even hybrid cars to 2035. The change of plan hopes to ensure very few fuel-guzzling cars are left on the roads when 2050's Net Zero becomes effective.**

Billions are spent by the UK government to make EV technologies more affordable and to expand and equip the electrical infrastructure in order to accommodate the growing demand. The number of EV charging stations is growing exponentially; according to Zap-Map, there are 11,332 EV charging locations in the country compared to 8,400 fuel stations.

Just like any other technology in its infancy, forward-thinking and future planning is essential. EV charging is developing at an accelerated rate not just to meet the demand but to address some of the fears drivers might have such as range anxiety.

It is almost impossible to enhance EV charging without addressing the infrastructure that supports it. Many local

councils, universities and businesses are likely to install EV charging hubs. These hubs have the advantage of getting a single point of connection from their local DNO network using a transformer. This allows the hubs to be resilient to

changes like increasing the number of charging points and upgrading to rapid chargers.



Wilson Power Solutions has been working with one particular DNO to manufacture a bespoke transformer to be rolled out to EV hubs. Picking the right transformer allows you to maximise the longevity of your assets. Our Wilson e3 Ultra Low Loss Amorphous Transformer does not only reduce energy losses and improve the carbon footprint of EV charging hubs and stations but it can also come with on-load tap changers

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# The Re:fit 4 Energy Performance Contract has launched

Through this procurement initiative we support local and combined authorities prepare and implement programmes of energy efficiency and renewable energy projects. This helps reduce carbon emissions, create income and enable change at scale and pace.

To find out how Rachel and her team can help you draw up robust plans that lay the groundwork for future implementation email [rachel.toresen-owuor@local.gov.uk](mailto:rachel.toresen-owuor@local.gov.uk) or call on 07825 963 218.

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