

# THE EMA MAGAZINE

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## EMA RECOGNISED ENERGY MANAGER

an interview with Paul Graham

## THE BENEFITS OF A CLOSE WORKING RELATIONSHIP

between the Facilities Manager  
and Energy Manager

## ENERGY AUDITING GUIDE

basics and techniques

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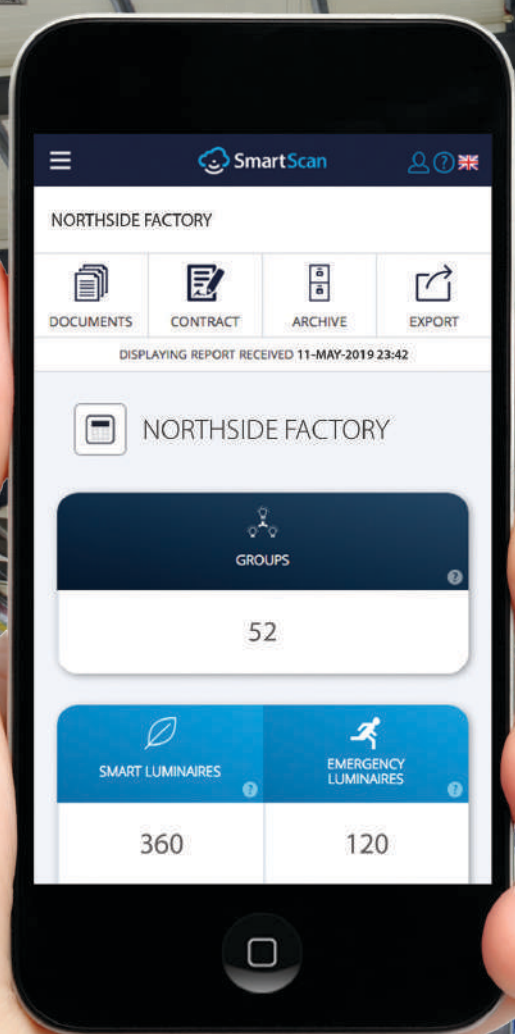


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Independent Energy Professional &amp; EMA Board Member



## THE EMA MAGAZINE

# Dear Reader,

To many people, energy is something seasonal. As autumn arrives, lights and heaters come back into use and energy stories re-emerge in the news; usually price rises and risks of power cuts as winter storms bite. So it came as some surprise to many, including some large organisations, to find power disruption as the number one national news item on a warm August evening.

The news talked about the triggers for the disruption, a gas power station and a wind farm connection, but it was the impact on businesses and their customers that became the real story. The focus moved from what caused the fluctuations in power supply to how businesses coped... or didn't.

The events underlined that in a future of increased electrification and diverse generation, the need for organisations to be both flexible and resilient has never been higher. Maintaining the quality and quantity of our power network is not just the domain of modellers and a few generators. End users of energy have an increasing role to play. More than ever, organisations need those who can understand their energy dependencies and steer their businesses towards smart solutions.

The EMA is there to help you become that highly effective and responsive energy professional. Its wide range of in-house training courses can help you develop aspects of energy management that are new to you. Through the pages of this magazine, as well as events such as EMEX, keep up to speed with the latest thinking and hear how other energy managers across diverse industry sectors are meeting their challenges.

Finally, have a think about what great things you have achieved this past year and let others know by entering the EMA Energy Management Awards before the October 25th deadline. Who knows you may be making the news yourself as a winner.



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ENERGY

# Energy Management at the National Institute of Biological Standards and Control

**In this regular feature, we focus on how organisations across different industries approach energy management. In this issue, we are exploring the world of biological research and medicines through one of its global leaders: The National Institute of Biological Standards and Control (NIBSC). Jude Hughes is the Environment and Energy Manager at NIBSC who has led the Institute's efforts to reduce its impact on the environment, securing impressive results to date, with savings of over £2.3 million from a range of initiatives. Jude has received a number of industry awards for her work, including Energy Manager of the Year in 2016.**



NIBSC is a global leader in the characterisation, standardisation and control of biological medicines. We play a major role in assuring the quality of these medicines worldwide through the provision of biological reference materials, by testing

products and by carrying out research. Our scientists provide advice on a routine basis to the UK Government and in response to emergencies such as the recent Ebola pandemic.

NIBSC is a highly specialised research Institute, so inevitably it is an energy intensive organisation. The site was built in the early 1980s and its infrastructure and plant rooms reflected the standards of that time; the insulation was poor, and the equipment was old and not energy efficient.

Electricity is the largest energy cost on the site. Our extensive laboratory environments require constant lighting, conditioned air, freezers, scientific equipment and bespoke machines backed up by a large number of plant rooms. My first priority was getting the electricity meters to turn more slowly. We achieved this by setting up replacement programs for lighting and air handling units (AHUs) – this was one way of tackling the challenge of the older equipment – and by pushing through behaviour change initiatives. We followed up these early wins with a whole array of energy-saving projects that had real impact on our energy use; as part of this, we replaced the large gas boilers and the onsite electricity transformers.

“ THESE EARLY WINS WERE KEY IN DEMONSTRATING TO THE SENIOR MANAGEMENT TEAM AND SCIENTIFIC STAFF THE ACTUAL SAVINGS THAT COULD BE ACHIEVED ON OUR SITE. THE RESULTS GAVE CREDIBILITY AND CONFIDENCE ON WHICH I COULD BUILD. ”

## What does energy management mean at NIBSC?

Due to the nature and scale of our scientific research work, we were from the start conscious of our responsibilities to reduce our energy consumption and our carbon emissions.

I introduced a raft of no cost and low cost energy initiatives. These early wins were key in demonstrating to the senior management team and scientific staff the actual savings that could be achieved on our site. The results gave credibility and confidence on which I could build.

This was important for future capital investment. At that time there were a large number of stakeholders competing for business and this presented challenges for environmental initiatives. Having a clear energy management strategy enabled us to identify and then develop sustainable projects which could facilitate optimum delivery of the science and yield the added benefit of reducing our energy bills



and carbon footprint. A win-win scenario. We were able to realise significant reductions, cutting our onsite electricity consumption by 16%. This yielded a saving of over £1.7 million on our site energy costs.

### How does NIBSC deal with energy management?

Establishing the carbon footprint for the site was vital. This provided us with a baseline from which to measure the impact of our energy-saving projects. We used the DEFRA methodology for environmental reporting, with UK Government conversion factors, to model the carbon emissions and meet mandatory annual reporting requirements. The large majority of our carbon emissions are directly attributable to electric and gas usage. We made it a priority to reduce the carbon footprint whilst continuing to provide high-quality working conditions for our scientists and support staff. So far, we have managed to reduce the impact of our carbon footprint by 36%.

We developed robust business cases for a series of large-scale capital projects aimed at reducing costs and carbon still further. The PRINCE2 methodology, which involves “selling” business cases to senior

management and key stakeholders, has given us an effective, precise structure to work with. All the projects are evaluated on criteria including savings in energy, carbon and overall payback.

Our priority was to improve the site infrastructure through replacement of older plant. We developed a major project to replace our three 25-year-old boilers with more energy-efficient versions. This project cost £1.3 million. We were particularly keen to introduce additional energy-saving technologies alongside standard features; these included an economiser, quality lagging, heat recovery systems, variable speed fans and pumps. There is a nine-year payback, so

“ IT IS SO IMPORTANT TO REVISIT PARAMETERS, SUCH AS THOSE CONTROLS SET VIA A BMS, AND TO ADAPT TO CHANGES IN ROOM USE. ”

we are realising the rewards of this project year on year. This has helped to contribute to an overall saving of 20% on our gas consumption.

At any one time we have numerous refurbishment projects under way to update our laboratory facilities. We have developed an ‘energy-saving

package’ which ensures we pack in efficiency features without compromising on the quality and output of the science. In the early design stages, we identify key features such as lighting, controls and daylight-enhancing sun tubes. We look at heating requirements, zoning and controls. We address the all-important insulation improvements through double glazing, and wall and roof insulation. Through these practical measures, we can factor energy efficiency into our strategic investment and embed it as a consistent site-wide strategy.

### What areas of every day business at NIBSC are most challenging in terms of energy management?

NIBSC predominately consists of scientific laboratories. These contain all the equipment necessary for the complex research carried out within them on cancer, polio, influenza and many more areas of medicine. On the site we also have containment laboratories for microbiology work, where isolation from the surrounding environment is paramount in order to prevent infection or release of pathogenic organisms. This critical containment is achieved by supporting plant and equipment. For instance, the HVAC systems (heating, ventilation and air conditioning) are crucial to the provision of high quality conditioned air, controlled temperatures and the removal of moisture and airborne bacteria.

In such environments, it is important to have a sensitive approach to energy management and our work alongside the scientists: it is essential to maintain a balance between saving energy and providing a safe laboratory environment.

To assess the energy demands here, I invested in a robust automatic monitoring and targeting system (aM&T) to complement the site’s wide-ranging Building Management System (BMS). We installed layers of sub meters to help us make these changes; I use these to review and check anomalies in energy usage.



I can give you an example of how this works in practice. I worked with the site's BMS Manager to review the historic programming of AHUs in laboratory areas. In just one plant room, savings of over £5k were achieved instantly by updating the timing and zoning measures of the equipment. The next thing we did was to duplicate this across all the plant rooms. It is so important to revisit parameters, such as those controls set via a BMS, and to adapt to changes in room use.

practice we were achieving a solid 10% saving in energy. These savings have continued to grow, and we have transferred these campaigns into a switch-off strategy for the site over the Christmas week, with endorsement from the senior management team.

“ I LOVE THE CHALLENGE OF MAKING ENERGY MANAGEMENT GOOD FUN AS WELL AS INFORMATIVE. ”

**What part does staff behaviour change at NIBSC play in terms of energy management?**

I have always felt that behaviour change is a worthy “project” in its own right. We should absolutely be using it to complement the results achieved through capital investment. The way this is done, getting the tone right, is critical to its success. The job of our scientific staff is to undertake complex research, so our energy management needs to fit in and not be burdensome.

It is invaluable to be able to demonstrate to staff what can actually be achieved in practice. I developed site-wide switch-off initiatives, first working with smaller groups of staff and building up to the entire Institute. After repeated

I love the challenge of making energy management good fun as well as informative. For me, the job is all about generating innovative, original ideas. We have run a lot of initiatives, including an eco-bike to power laboratory equipment, eco-driving with a Top Gear-style leader's board, and a staff Pledge Wall. In the lead-up to Christmas one year, I held a competition: “The Twelve Days of Switch-Off”; people wrote their own words to the traditional Christmas carol announcing what they would turn off over Christmas. I had a choir, the site's Director and the Institute staff all singing along!

I believe in leading by example. I hope that I have embedded sustainable development in the Institute, through culture change and by developing a ‘green’ community

ethos. I work with staff to ensure they take individual responsibility for their energy usage. And at night I wander the corridors to check on their progress!

**Can you describe an energy management project that reflects the organisation's principles and corporate responsibility when it comes to energy management and environment?**

The Institute took its first steps into renewable technology in a significant project in terms of scale and environmental impact: the NIBSC Solar PV Project. I have to say that this particular project hit the UK solar industry at a turbulent time. Several Government consultations had commenced that went on to have a far-reaching impact on the solar industry. As a result of these various uncertainties, I adapted the initial project proposal and sought further funding to increase the investment opportunity due to the changing market. I also recognised that the roof space at NIBSC represents

‘an asset’, so I sought to change the panel specification to higher output panels of 300kW to maximise the opportunity presented by the roof space.

The project had a number of complexities. Due to the importance of continuous electrical supply to the site and the specialist nature of the scientific work carried out there, power supply and its security was crucial. It was essential that the project provided both grid resilience and full integration with site-wide emergency back-up generators. This added a layer of difficulty to the project, and we had to develop a robust strategy to handle this and give confidence both to the individuals managing the power supply and to the scientific staff that the project would not disrupt working practices.

The Solar PV Project involved the installation of a 442kW array across seven south-facing rooftops; a total of 1,490 solar panels were installed. The estimated output was





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profiled, using project specifics and local weather conditions, to model projections across a typical year. A total saving of £2.5 million was estimated from three main sources – off-setting grid electricity, Feed In Tariff payments (FITs) and carbon tax abatement – across the twenty-year project lifecycle. Payback was set at seven years with an estimated 8% reduction in the annual electricity requirements.

Our key stakeholders have responded exceptionally well to this first step into renewable energy; and so have NIBSC staff, which is very pleasing. We have enhanced the Institute’s reputation for corporate responsibility; the project has not only generated a lot of energy but also significant interest.

### What is in the pipeline for the future?

There has been so much happening at NIBSC that has had a positive impact on reducing our energy usage, so much good work. I am keen to continue this. Following on from the implementation of the Solar PV Project this coming year, we are going to undertake a feasibility study which will help us to assess the further benefits of renewable technologies, such as large-scale energy generation and energy storage options. It will be fascinating to see how they measure up for our site.

Renewables hold great potential

for us. If it all follows through, we shall be able to produce our own, cleaner, power and become less reliant on the mains grid. Right now, we are looking at other areas of the site where we can install solar technologies such as solar-style carports and integrated vehicle charging points. The environmental benefit is appealing; I hope that these potential projects will carry the necessary savings and payback for us to implement them.

NIBSC has made itself a leader in the environmental field by getting on and making changes, by actively following through on ideas and initiatives. We hope to continually invest in energy-efficient technologies which will equip us to drive innovation and future-proof our operations and site facilities for the vital scientific work that we do here.

### Author’s profile:

Professionally speaking Jude grew up on landfill sites, working as an Environmental Manager for landfill and waste-to-energy sites. At the Carbon Trust, she managed a £35 million program for businesses to invest in energy-efficiency. She then became the first Energy Manager at NIBSC, a perfect place to channel her energy! Jude’s achievements were recognised in top industry awards in 2016; Energy Manager of the Year (Energy Institute); Government Energy Manager of the Year and Government Energy Project.



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# The Benefits of a Close Working Relationship between the Facilities Manager and Energy Manager

**In many organisations the Energy Manager (EM) and Facilities Manager (FM) may sit in different departments and have little communication with each other. However, their goals are very similar and collaborative working can complement each other's roles significantly.**

The FM's goal is to ensure that the built environment is functional, safe, comfortable, efficient, sustainable and cost effective with the purpose of maintaining the wellbeing of building occupants and the productivity of the organisation. And the EM's goal is, well, the same.

The EM's job would be done if they could simply turn off all the lights, plant and systems that consume energy but this building would then cease to be a functional workplace and its only purpose would be to provide shelter. The key is to optimise energy usage to provide a healthy, cost-effective and productive workplace. It can seem crazy to spend £100,000's on solar PV that are placed on buildings where the services are old and unreliable and it's too hot/cold, underlit/overlit, draughty, damp and generally an unpleasant place to be.

Although the goals are very similar, the approach can be different. The FM will normally have a set budget that they need to spend wisely to keep the building ticking and the EM will often need to prepare a business case and bid for funding to deliver projects that provide a cost and carbon saving. Ensuring that there is good communication between both parties and delivering projects in partnership can align their goals and make everyone a winner.

## It's not all about saving energy

Lighting is a vital part of a building and a service that can complement the role of both the EM and FM. The EM should be able to provide the business case

to replace older lighting with LED luminaires and control. The business case should include details of the capital required to replace the lighting and savings in; maintenance, electricity, carbon, distribution charges (Triad and Available Supply Capacity etc.) and include the return on investment and long term financial savings.

The savings in maintenance can have a big impact in a large facility and the role of an FM in replacing expired lamps and ballasts can be resource intensive, take up a lot of storage space and be costly, particularly where this service is contracted to an external party. We recently provided the business case for an NHS Trust where the electricity savings in year one was £170,000 and the maintenance savings were £39,000 due to the extended life expectancy of LED lighting. The maintenance savings were an important factor considered during the decision-making process to award the capital budget to deliver the project.

Including a full lighting design is also highly recommended as part of any lighting scheme to

ensure that the correct lux levels, colour rendering, colour temperature, uniformity and ambiance are achieved in every space. A competent lighting design will improve the lighting quality and enhance the wellbeing of occupants and reduce complaints to the FM.

The EM may want ownership of this project as they prepared the business case, but it needs to be delivered in partnership with the FM as they will take ownership for the lifetime of the asset. This goes for all projects and careful consideration of maintenance needs to be considered when specifying equipment. Ongoing maintenance needs to be practical and cost effective otherwise it may not be maintained as designed and cause a burden to the FM. It may help the EM's financial assessment and payback period to specify cheaper equipment, but the asset needs to be reviewed over its lifetime and not just how much it costs to install.

“ ENSURING THAT THERE IS GOOD COMMUNICATION BETWEEN BOTH PARTIES AND DELIVERING PROJECTS IN PARTNERSHIP CAN ALIGN THEIR GOALS AND MAKE EVERYONE A WINNER. ”

It can be easy for the EM to propose projects without thinking about, or being aware of, future implications and careful investigations into the asset are required before committing to a project.

A common energy efficiency recommendation is TRVs on radiators as these are relatively low cost and a recognised measure to improve local temperature control, but this is not suitable in every case. We were asked to project manage the install of TRVs on cast iron column radiators but upon closer inspection it was clear that fitting a TRV to the old radiators would likely cause strain to the radiator connections which in turn could lead to the radiator cracking. A problem the FM would then likely need to address.

### Collaboration and communication

When I was Energy Manager at Portsmouth City Council, I worked closely with the FM, design engineers and onsite technical staff of the Civic Offices to build the business case to remove 300 portable electric heaters. We calculated that the portable heaters were a significant cost to operate and also provided additional safety issues of having a high number of plug-in electrical heaters that were across an office and often left operating at all hours.

In order to remove the heaters, we needed to assure staff that the temperature levels would be adequate and to do this we needed a new BMS. But in order for the BMS to work effectively, we had to remove the heaters as having a heater located near a temperature sensor could fool the BMS into thinking the space temperature was warm, which would in turn hold back the space heating for the

whole zone and make the area cold, meaning that more people would request an electric heater. A cycle that can escalate if not managed properly.

We built the business case together and were awarded a budget to install a new BMS, field devices and remove the heaters. Comfort levels and working conditions improved significantly and energy usage was reduced by around £30,000 by controlling the plant better and removing the heaters.

“**COLLABORATION AND COMMUNICATION BETWEEN THE EM, FM, ENGINEERS, BOARD MEMBERS AND BUILDING OCCUPANTS CAN ENCOURAGE ALL TO FEEL ENGAGED AND PROMOTE A GOOD NEWS STORY THAT EVERYONE CAN FEEL PART OF.**”

### Collaboration for promotion

Collaborative working can also support good news stories. We were appointed by the FM at Eastleigh Borough Council to undertake an audit of the BMS installed in their Civic Offices as control parameters on a BMS can fall out of optimum settings over time and need to be reviewed.

We identified that the heating and cooling plant were fighting each other leading to unbalanced temperature conditions and avoidable energy costs. The BMS strategy was changed and the temperature conditions were improved.

The FM informed the EM of the adjustments and the EM was able to monitor the energy data over the coming months and determined that the reduction in electricity usage alone led to a saving of £16,000 in year 1. This project could then be promoted as a good news story as working conditions were improved, complaints were reduced and there was a notable financial saving. Win-win.



Collaboration and communication between the EM, FM, engineers, board members and building occupants can encourage all to feel engaged and promote a good news story that everyone can feel part of. The leading Energy Managers are the ones who communicate and work closely with all key stakeholders.

### **The future of EM and FM**

The relationship between the FM and EM should strengthen in the future. There are already systems available in the market that combine controls, sensors, building services equipment, asset monitoring and data management that should make managing facilities more effective and reduce energy costs.

An example of this is LED lighting that can have sensors incorporated to monitor occupancy, temperature, daylight levels and CO2 so that controls can adjust the temperature, ventilation and lighting levels so that the recommended levels are provided and ensure that services in unoccupied areas are set back or turned off. These sensors can also be used to track devices and equipment and each luminaire can be used to transmit data to improve connectivity within a building through WiFi or LiFi. This can help with asset management and utilise a building so that the space is used more efficiently which can also reduce the wear and tear on facilities.

Building the business case to deliver energy efficiency projects is an excellent opportunity to improve the

“ **THE RELATIONSHIP BETWEEN THE FM AND EM SHOULD STRENGTHEN IN THE FUTURE.** ”

working environment and wellbeing of occupants. A well-designed solution can improve lighting quality, temperature, fresh air and overall comfort levels which can be delivered with reduced energy costs and an attractive ROI. This can also reduce the effects of sick building syndrome which can improve productivity, reduce sick leave and increase job satisfaction.

The Energy Manager can have such an important role on the operation of a building and the occupants who use it and it's not all about saving energy.

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

Alan Barber is a Chartered Energy Manager and Director of an energy and engineering consultancy, Salvis. He worked as an internal Energy Manager at Portsmouth City Council for many years and co-founded Salvis to support other organisations to develop their energy strategies and design cost effective solutions to improve facilities and reduce cost and carbon emissions.



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# Keele University's Smart Energy Transformation

**One of the most fascinating challenges facing the UK economy in the 21st century is the implementation of the infrastructure required to modernise and future proof the electricity network that we all rely on. The increase in capacity required to facilitate decentralised energy generation, the mass rollout of electric vehicles, and the electrification of heating systems whilst decarbonising at the same time requires entirely new processes and technologies – many of which are yet to be deployed in the real world. Gone are the days of simply matching supply to demand which left incredible inefficiencies throughout the system. The engineering challenge of such endeavours is vast, as will be the impact on how we manage energy within such systems.**

Keele University has committed to play its part in enabling this change by transforming itself into a 'living laboratory', leveraging its extensive private utility networks to allow for the testing of the new equipment and processes that will be required to facilitate the technical revolution. Its Smart Energy Network Demonstrator (SEND) project, first proposed in the mid 2000's, is being delivered across the entirety of its campus and will have seen the investment of more than £20m by the time of its completion in 2021.

A unique feature of Keele's campus is that it is similar to a small town, with its own private gas, heat, electricity and water networks serving more than 340 buildings ranging from semi-detached domestic houses to academic buildings and high-tech pharmaceutical manufacturing facilities. When fully up and running, SEND will have transformed the campus into the largest at-scale system energy test-bed in Europe.

All of this will make the Energy Management on campus far more complex. It is already a significant challenge monitoring consumption with only 15 gas

and electricity supply points from the national grid feeding more than 1,800 sub meters. The existing energy management system, certified to ISO 50001, will need to evolve to allow for effective management of a system of bi-directional, interconnected generation and demand points that can rotate several times per day.

## What is a smart energy network?

Smart networks are fundamentally adaptable. They retain the ability to optimise based on changing conditions and have the data monitoring facilities to allow for forecasting to understand when these conditions are likely to change.

Whilst modernisation within the hardware that delivers energy is required to some degree to allow for adaptability, the real innovation exists within the software systems which can capture incredibly complex data from many different sources and translate it into automated actions based on pre-determined algorithms. The flood of digital data will exist in a multitude of different formats and the systems must be able to integrate with all of these platforms whilst providing the security to protect what in most cases will be sensitive data.

One important thing to note is that these networks will not inherently deliver energy savings. They are primarily working to flatten peaks in demand, to regulate costs by creating new market opportunities and to allow constraints to be avoided both locally and regionally. All of these may well act to lower energy costs; however, the energy saving opportunities are yet to be fully identified or understood.

The integration of 'Internet of Things' devices within the smart network will potentially allow for consumers



to limit consumption in line with their behaviour but it is in the data that the savings will become apparent. The feedback of consumer energy usage and machine learning algorithms may well be the key to delivering these through the change of behaviour that they could deliver.

The Keele's Smart Energy Network Demonstrator focuses on the following particular aspects:

### **1. Network control and automations**

The campus 11kV HV network with more than 25 substations has been extensively modified to allow automated switching and data collection at key points and a Supervisory Control and Data Acquisition (SCADA) software system has been installed to govern it. This control platform allows system flows to be understood and is the core of the SEND as it provides and analyses the data that the other systems rely on. Data reliability and speed is key, with each of the substations being networked with fibre-optics and in some cases radio links to provide resilience.

### **2. Demand response**

Whilst demand response opportunities in recent years have been focused on large energy consuming plant, the SEND project is seeking to aggregate many hundreds of small pieces of plant throughout the campus to collectively provide significant DR capability. These devices, which could include heating

pumps, air handling unit fans and air conditioning systems, are being identified and classified based on their ability to be turned down or off whilst not affecting the operation of a building or the comfort of its inhabitants. One of the core aims is to be able to operate the system without building users knowing that it is active.

“ **DATA QUALITY IN A SMART NETWORK IS ESSENTIAL, A FAMILIAR PRINCIPLE TO THOSE WITH A RESPONSIBILITY TO MANAGE ENERGY.** ”

### **3. High frequency automated metering**

Data quality in a smart network is essential, a familiar principle to those with a responsibility to manage energy. The SEND system requires both high level and granular data to allow for both forecasting of energy demand and to understand how a piece of equipment is responding to a DR event. The frequency of the reporting of data is also critical, with on-demand data essential,

making half-hourly and day +1 meters obsolete. The deployment of the network will see up to 1,500 additional sub-meters installed throughout the Keele campus with a variety of communication protocols to allow the collection of the necessary data to enable the system.

### **4. Electric mobility**

The increasing prevalence of electric vehicles is already causing concerns for the forward planning of the University electricity network. With a number of charging points in place already and the strategic desire to provide staff, students and visitors with sustainable transport options, the number will



increase significantly within the next decade. This will cause pressures on the available capacity of the electricity supplies from the national grid, therefore to remove the requirement for expensive offsite network upgrades each of the charge points will need to be 'smart' and the SEND will be actively managing the rate of charge for each point. The implementation of vehicle-to-grid, a largely untested approach to aggregate significant peak lopping capabilities, is also a significant work package of the project.

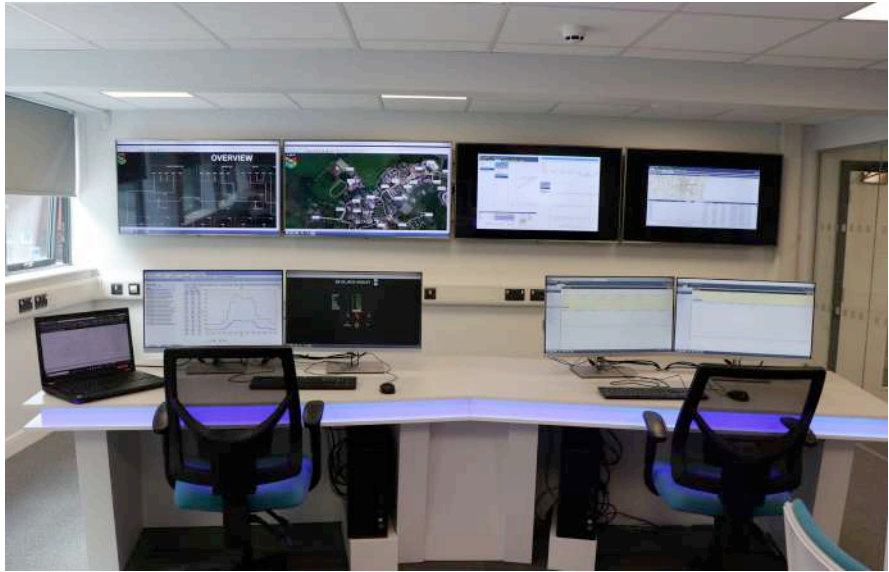
**5. Stakeholder interaction**

Automation of the smart network is essential but direct interaction with service users is an absolute requirement to making the SEND work for all stakeholders. Within the domestic homes and flats on campus all users will have in-home displays which not only have the ability to control equipment within the home (via IoT technology) but also provide the ability to convey information such as pricing and carbon intensity to provide the influence needed to deliver actual behaviour change.

A platform is also in place to allow the creation of applications within the actual control software to allow researchers to develop new ways of using the data and control available to optimise the system. This will allow, for example, the introduction of an app that will allow users to visualise energy consumption using augmented reality, bringing the system alive for all campus users to better understand how their behaviour affects the wider system.

**6. Digital twin**

For the University, reliability of its energy network is of



paramount importance therefore the SEND contributes more than just research and revenue opportunities. Clearly the integration of such a complex control system could provide significant risks and as such a digital modelling system is being incorporated to allow researchers that are utilising the system to model how new processes work before deploying it on the real network. This will avoid the prospect of even the smallest issues within the system translating into major headaches.

**Where are we now?**

The SEND system has progressed through the initial network installations, with the substation modifications complete and the software systems in place, live and providing automated control. The DR capabilities are fully functional in three of the largest campus buildings and a soak phase is currently being observed to understand lessons learnt and better plan how we go forward. One of the biggest challenges to date has been identifying where at the granular level of the network each of the DR assets are located – a critical aspect required for the control system to understand and adjust how each is performing during an event.

Due to be fully live by 2021, the University will take over the system in its entirety from this date with a new team currently being put in place to operate it. Our principle energy centre has been adapted to house both the control room for the system and an immersive learning space for the researchers who will be operating within the digital twin.

One of the most interesting realisations to date is that much of the granular control required



is already in place and compatible. For demand response particularly, the integration into the open protocols used within the existing campus' Building Energy Management Systems provide the control needed to turn equipment up or down. The integration of these existing systems has not only allowed for the SEND to be installed at a lower cost than might otherwise have been expected, it demonstrates how such systems can bring together many different data points and control systems – precisely what will be required when looking at deploying on wider national networks.

### Carbon Zero

Keele University committed to decarbonisation in May 2019 by declaring a climate emergency and pledging to net zero emissions by 2030. This is likely to be extremely challenging in the face of the expected campus growth, but the SEND project provides unique opportunities to minimise the impact of this whilst also allowing for the deployment of large scale renewables and diversification of fuel sources. There is no doubt for example that the University cannot hope to get anywhere near zero carbon whilst consuming more than 30GWh of natural gas for heating each year. The network itself will open the opportunity for a good proportion of this to be met by moving to dynamically controlled electric driven heating systems.

A sister project to SEND is running concurrently which will see the installation of a renewable energy park

on campus. Comprised of two wind turbines (1.9MW), more than 20,000 solar panels (6MW) and a 1MWh battery, the electricity will be directly connected to the University HV network. More than 50% of campus electricity demand is expected to be generated from the subsidy-free renewables which are expected to be fully up and running by January 2021.

Again, the SEND will be critical to ensuring that the maximum quantity of the generated energy is being used on campus first not only for financial reasons but also as the local network constraints are likely to prohibit the export required during peak generation periods.

The SEND programme (ref 32R16P00706) is funded through the European Regional Development Fund (ERDF) as part of the England 2014 to 2020 European Structural Investment Funds (ESIF) and the Department for Business, Energy and Industrial Strategy (BEIS).

### Author's profile:

Elliot is a Certified Energy Manager and has more than ten years' experience in energy management from a number of public sector organisations. He has been the Energy Manager at Keele University since 2016, leading on utility management and carbon reduction strategy.





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# EMA Recognised Energy Manager

The Energy Managers Association is pleased to announce that Paul Graham, the Utilities, Waste and Sustainability Manager at Kingston Hospital NHS Foundation Trust, has joined the ranks of the EMA Recognised Energy Managers after successfully demonstrating the knowledge and skills in energy management by combining the on-job practical experience with completing the entire EMA LEC 3 Energy Management in Practice training programme across the core energy management competencies.

The core competencies are:

- Technical and Operational Competency
- Energy Assessments, Measurements and Verification Competency
- Behavioural Change and Motivation Competency
- Regulatory & Legal Compliance, and Carbon Management Competency
- Energy Management Strategy and Plan Competency
- Waste Management Competency
- Energy Procurement Competency
- Energy Efficient Transport Competency
- Water Management Competency
- Information Technology Competency

For more information regarding the EMA Recognised Energy Manager status, please contact [jana.skodlova@theema.org.uk](mailto:jana.skodlova@theema.org.uk) or call 0203 176 2834.

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# An Interview with an EMA Recognised Energy Manager

## How did you become interested in energy management?

Energy management was offered to me as part of a training role to replace the organisation's previous Waste & Energy Manager. When he left, we found candidates who were good at waste or energy management but not both so they created the development role and asked if I would be interested in applying. No-one seemed to know what the previous manager did and there was no real handover as he had left three months prior to my appointment so I didn't really know what I was getting into at the time.

My interest in the field has grown over time as I found out more about it. During my first year, I was mostly focussed on waste which is mainly about compliance with statutory duties. All I gathered about energy from the time was that I had a lot more sales calls regarding energy than I did waste and that the billing and metering was very complicated.

As I attended training and events about energy over the second year, I found that energy management is more about opportunities to improve which I find much more stimulating than delivering waste services.

## What does your role at Kingston Hospital NHS Foundation Trust entail?

My role is to lead and manage Utilities, Waste & Sustainability services to support the delivery of Healthcare by the organisation. In practice, the role is a composite of waste, energy and sustainability management which were new roles to me alongside space and

performance data management which I retained from my previous role.

At a high level, I design energy, waste & sustainability services, monitor their performance and drive improvements.

I'm accountable for overall budgets and performance of all the utilities, waste services and sustainability reporting. The Trust's total spend on energy is around £2.5 million. The main Kingston Hospital site consumes over 40GWh of gas and 3GWh of imported electricity across 29 buildings built between 1868 and 2019 with a combined gross internal area of 75,000m<sup>2</sup>. We employ about 3,000 staff, who deliver A&E, Outpatient, Day Case and Maternity services to the population within 5 boroughs in South West London. We have 500 inpatient beds.

I'm currently overseeing the delivery of a £1.5m energy reduction project using the RE:FIT framework. We're well into the design phase now so this is starting to get exciting. I'm also providing expert advice to the Trust around the procurement of electricity and natural gas supplies.

## What is the most exciting part of your job?

I particularly enjoy two phases of the projects I work on. I find the design phase energising as I work with others to imagine what a great service or system would look like. I also find it gratifying when something I've been involved with

“NO-ONE SEEMED TO KNOW WHAT THE PREVIOUS MANAGER DID AND THERE WAS NO REAL HANDOVER AS HE HAD LEFT THREE MONTHS PRIOR TO MY APPOINTMENT.”

delivers measurable results which I can communicate to the rest of the organisation. It was great to finally see our half hourly consumption data integrated into an online platform that key staff can see wherever they are. It will be wonderful to see the energy savings monitoring and verification reports from RE:FIT.

## What is the most frustrating part of your job?

I think the lack of focus which comes from a composite role can be the most frustrating thing. Often, I spend time on the non-important but seemingly urgent matters which mean I have to delay the larger projects which will make a greater longer-term impact. On occasions when I carve out time specifically to focus on something significant, I end up worrying about the small things I'm not doing.

To overcome this, I've spent the last year working from home one day per week. This means I can plan to spend time on anything that needs special uninterrupted focus on this day without worrying about everything else. The results have been pleasing to both myself and my manager. I don't think the RE:FIT tender would have been completed without it.

I'd like to spend more time on energy management.

## Pointers to improve your ESOS outputs Avoiding ESOS non-compliance

	<b>What is it</b>	<b>What to do/include</b>	<b>Making it even better</b>
<b>Organisation Structure</b> 	<p>A diagram/list of the corporate group (all the undertakings that share a common ultimate parent).</p>	<ul style="list-style-type: none"> <li>Overseas parent(s) and highest UK parents(s) of the corporate group established.</li> <li>All active undertakings included.</li> <li>Authorisation letters present from highest parent(s) to:               <ul style="list-style-type: none"> <li>support aggregation/disaggregation (if applicable)</li> <li>confirm a responsible undertaking (if not a highest UK parent).</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>A 'company tree' showing the parental structure of the corporate group on the qualification date, that includes:               <ul style="list-style-type: none"> <li>overseas and highest UK parent(s)</li> <li>all UK and overseas undertakings and their level</li> <li>status of each undertaking (active, dormant or dissolved etc.)</li> <li>whether the undertaking consumes energy</li> <li>breakdown into participants (if applicable)</li> <li>qualification status of each undertaking (large or relevant).</li> </ul> </li> <li>Information based on the date at which the ESOS assessment was carried out to highlight any company changes during the compliance period.</li> </ul>
<b>Total Energy Consumption (TEC) and Significant Energy Consumption (SEC)</b> 	<p>TEC: all input energy consumed by the participant.          SEC: at least 90% of the TEC; the energy use that is audited or covered by an alternative compliance route.</p>	<ul style="list-style-type: none"> <li>TEC to include all input energy from buildings, processes and transport for the participant.</li> <li>The same compliant reference period is used to collate the TEC across the participant.</li> <li>TEC displayed in a data summary table supported by verifiable primary evidence (invoices, half hourly data, manual reads, etc.)</li> <li>Data in a common energy unit or £s.</li> <li>Conversion factors stated and referenced.</li> <li>Where verifiable data is not available estimates are used supported by calculations and explanations.</li> <li>Rationale for SEC/de-minimus selection provided.</li> </ul>	<ul style="list-style-type: none"> <li>Compliant reference period selected that best represents the expected future business direction of the participant.</li> <li>Data summary, primary evidence, conversions factors and estimate calculations easily accessible from evidence pack.</li> <li>Use of estimates minimised and justification recorded.</li> <li>Breakdown of TEC into energy using areas.</li> <li>Record of any sites/activities that are excluded from the TEC and justification provided.</li> </ul>
<b>Sites, Assets &amp; Activities</b> 	<p>All sites, assets and activities that use energy including transport.</p>	<ul style="list-style-type: none"> <li>All sites, assets and activities considered (including transport fleets and private vehicles).</li> <li>Responsibility for landlord tenant situations determined.</li> <li>Premises moves during compliance period considered.</li> </ul>	<ul style="list-style-type: none"> <li>For landlord tenant situations, supplies are broken down individually and responsibility determined by operational control.</li> <li>For premises moves during the compliance period supplies are broken down individually and activities which are continued are considered.</li> </ul>
<b>Sampling Approach</b> 	<p>A methodology for selection of site visits to support the energy audits.</p>	<ul style="list-style-type: none"> <li>Sampling approach is representative of SEC.</li> <li>Variations in; activity, building type, size etc. are all considered.</li> </ul>	<ul style="list-style-type: none"> <li>Robust sampling approach used with a large number of 'site visits' carried out at for each variation in; activity, building type, age, size, etc.</li> <li>Site audit selection takes into consideration future business direction of the participant and previous energy audit work.</li> </ul>

# Pointers to improve your ESOS outputs Avoiding ESOS non-compliance

<p><b>ESOS Energy Audit</b></p> 	<p>Audit(s) of the participants SEC that meet the minimum ESOS energy audit criteria.</p>	<ul style="list-style-type: none"> <li>• 12 months of energy audit data is used in line with the minimum ESOS energy audit criteria.</li> <li>• Displayed in data summary tables supported by primary evidence.</li> <li>• Conversion factors stated.</li> <li>• Estimates supported by calculations.</li> <li>• This can be the same as the TEC data.</li> <li>• Analysis conducted on the data for each of the sites that were visited (including transport), e.g. a breakdown of supply type by area/activity/appliance.</li> <li>• Energy Profiling carried out where appropriate and reasonably practicable.</li> <li>• Any compliance by alternative routes is supported by valid certificates.</li> </ul>	<ul style="list-style-type: none"> <li>• Strategic selection of compliant 12 months of energy data to increase the benefit of the assessment, such as optimisation of 'actual' data (noting audit data can differ from the TEC).</li> <li>• Data summary, primary evidence, conversions factors and estimate calculations easily accessible from evidence pack and all correlate with each other.</li> <li>• Suitable justification for use of estimates recorded.</li> <li>• Where relevant additional analysis methods such as degree day analysis and bench marking are utilised.</li> <li>• Use of energy profiling is maximised.</li> <li>• Justification provided for any areas where further analysis is unsuitable.</li> </ul>
<p><b>Energy Savings Opportunities</b></p> 	<p>Reasonably practicable opportunities that will save energy for the participant once implemented.</p>	<ul style="list-style-type: none"> <li>• All reasonable opportunities identified for each visited site and transport.</li> <li>• Cost benefit calculations provided for each individual opportunity, either Simple Payback Period (SPP) or Life Cycle Cost Analysis (LCCA), as appropriate.</li> <li>• Cost benefit calculations extrapolated to non-visited sites within the SEC (where applicable).</li> <li>• Lead Assessor discloses any opportunity types which they have a commercial interest in.</li> </ul>	<ul style="list-style-type: none"> <li>• Lead Assessor and participant agree and document what constitutes a reasonable energy savings opportunity.</li> <li>• Justification provided for any obvious opportunities that are missing.</li> <li>• Each opportunity can be traced back to the corresponding energy audit analysis work, with clear calculations, which resulted in its identification.</li> <li>• Use of LCCA is maximised, particularly for high capex or long life projects, were appropriate and justification for use of SPP is provided.</li> <li>• If the implementation of one opportunity effects the benefits of another this should be taken into account to avoid double counting.</li> <li>• Opportunities are ranked into a logical order to assist presentation to board members e.g. lowest cost, shortest payback, biggest savings potential.</li> </ul>
<p><b>Lead Assessor and Board Level Sign Off</b></p> 	<p>Sign off of ESOS assessment.</p>	<ul style="list-style-type: none"> <li>• Lead Assessor sign off present, to confirm assessment meets the ESOS Regulations including lead assessors registration body.</li> <li>• Board director sign off present, to confirm assessment has been reviewed by the board. If the director is not at board level, then justification must be provided.</li> </ul>	<ul style="list-style-type: none"> <li>• Lead Assessor selected that has experience within the participants sector.</li> <li>• Board level director sign off present against the four bullet points.</li> <li>• Presentation of ESOS assessment findings delivered to board.</li> </ul>
<p><b>ESOS Notification</b></p> 	<p>Online confirmation of compliance to Environment Agency.</p>	<ul style="list-style-type: none"> <li>• Notify the Environment Agency of compliance after the ESOS assessment is complete and before the compliance deadline for the Phase.</li> <li>• Answer the compliance questions using the information collated from the sections above.</li> </ul>	<ul style="list-style-type: none"> <li>• At least one of the primary or secondary contacts should be from the participant organisation as opposed to the lead assessor organisation.</li> <li>• A copy of the notification retained within the evidence pack.</li> <li>• Answers to all voluntary questions provided.</li> </ul>
<p><b>Evidence Pack</b></p> 	<p>A folder on a server or hard copy where you keep copies of the information that supports your ESOS assessment.</p>	<ul style="list-style-type: none"> <li>• Documents all records from the above sections.</li> <li>• The location of any documents not held directly in the evidence pack (e.g. invoices) should be referenced.</li> <li>• Be in the hands of the participant not just the third party lead assessor organisation.</li> </ul>	<ul style="list-style-type: none"> <li>• A contents page.</li> <li>• Document control.</li> <li>• The evidence pack 'is' the ESOS assessment and should show the approach taken by the participant to comply with the scheme.</li> </ul>

## Can you describe your typical day?

A typical day might involve spending periods of time on any or all of the areas I cover so I start the day by creating a list of three important things I want to get done that day. I usually manage to achieve two to three of these every day, so it keeps me motivated. Anything else I manage to complete is a bonus. I also use a set of three weekly goals to remind me what's most important this week. The daily big 3 usually contribute towards these. This is based on the Free to Focus system developed by Michael Hyatt, an American productivity guru. I've found it useful as a framework to structure my day around the most important things.

Then I process emails and messages, adding new tasks to my to do list and responding immediately to anything I can answer within about two minutes or less. If a request is going to be time consuming and is relevant to my role, I'll schedule some time at an appropriate moment to deal with it.

Most importantly, I check the energy management system to see if there were any anomalies during the previous day that need addressing.

The rest of the day is a mixture of meetings, completing my daily three activities and reacting to whatever else comes up. Likely interruptions are contractors who need to be signed in and given access, colleagues asking for my opinion or technical help and information



requests from management. I try to minimise the number of meetings I arrange or attend to those that have the right people in the right place at the right time to deal with a particular issue rather than having regularly scheduled update meetings.

Controversially, I don't have an internal phone extension. I realised early on that 85% of all the calls I received were sales calls. I'm also not at my desk all that much over the day so the phone ringing was annoying my colleagues. The relatively few people who need direct access to me have my work mobile number and everyone else is pointed towards email, which I clear most mornings.

At the end of the day, I review. Did I finish my daily three tasks? Are there any notes or actions I need to capture? What's going on tomorrow? Etc. I've recently started trying to leave something hanging to consider

the following morning after I've slept on it.

I carry out a weekly review every Friday afternoon to check progress against the weekly goals.

## What drives you?

Christian faith. My relationship with Jesus Christ is foundational to who I am. I enjoy the goodness of God in giving me worthwhile work to do and I believe that the work of the healthcare sector is particularly worthwhile. It's exciting that in my capacity as energy manager, I can contribute to reducing the cost burden and environmental impact from what we do. The NHS is a great example of the Biblical idea of grace. Every day we literally give away healthcare services which cannot be earned or merited. There aren't many business models that work on this basis.



## What qualities should a good energy manager possess?

I think there's room for a wide range of approaches within the discipline depending on personality and situation. I think the following qualities, listed in no particular order, are useful:

**Communication** – to explain the merits of what you propose to change in ways that everyone can understand and speaks to the people you are trying to persuade to take action. People need to know what's in it for them.



*Resilience* – to be able to take any lack of interest from your organisation, rejected business cases or lack of understanding in your stride and try again.

*Disciplined prioritisation* – to know what's best to do next and to do it. Ability to decline – to articulate a tactful but firm no to non-essential responsibilities.

### **What prompted you to increase your knowledge through training courses?**

I started from a very low base knowledge, my previous seven and a half years were spent in administration and analysis for soft FM functions like telecoms, cleaning, post and catering etc. Also, expectations varied within the organisation. Some thought I was going to be an engineer, some an administrator, some a green champion.

I needed to know what the job actually was from other professionals and how to do it well. Having initially completed the EMA's two-day foundations course, I thought that their approach was about right. Specifically, it helped to understand the need for energy managers who know what questions to ask of suppliers to signal good quality and to know how to explain technical benefits simply to management.

### **You have become the first EMA Recognised Energy Manager who achieved the professional status by combining the on-job practical experience with completing the entire training programme across all energy management topics. Could you suggest instances where you have already applied the training to your organisation?**

I found the practical focus of the courses very helpful. Whenever possible, I took at least one thing away from each which I could apply straight away.

Following the procurement course, we've taken the bold move to move away from the main public sector buying framework for energy so we can explore other options which might deliver better value.

The technical and operational modules equipped me for what to expect in plant rooms and what signals to look for that may indicate poor performance. I've also been able to advise management regarding what they can expect from electric vehicles and battery storage.

The measurement, assessment and verification modules helped me to evaluate current performance and recommend specific high-use areas for the organisation to focus on.

### **Do you think that the EMA Recognised Energy Manager status will allow you to highlight your credentials as an energy manager?**

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

### **What advice would you give to energy managers who are planning to undertake the Knowledge and Skills' Gap Analysis Interview with the EMA?**

Don't panic. Despite some technical difficulties on the day, I found the discussion format of the interview was much less stressful than I had anticipated. I had met both interviewers during the courses and it was reassuring to be talking through what I'd learned with familiar faces.

### **What does next year hold for you?**

I hope to complete phase 1 of the RE:FIT project and start designing phase 2. I'm coordinating the design of a new energy centre for our main site which will hopefully take shape in the next 12 months. On a personal level, my wife and I are also in the process of being approved to adopt so I'm hopeful that we'll be bringing a child home soon. But what actually happens is in God's hands, I'm happy with that.





# Energy Management at the Sharjah Electricity and Water Authority (SEWA)

## SEWA and energy management

Sustainability is the core of SEWA's decision making process and with the widespread support of the Paris Agreement on Climate Change, we finally see a great momentum building up to tackle climate change. At SEWA, we are playing an important role in de-carbonisation of the UAE economy by switching to cleaner fuels, adopting renewable energy and promoting electric vehicles. Thriving on a spirit of commitment to safe, reliable and sustainable delivery of energy and water to consumers, SEWA owns, operates and maintains power stations, desalination plants, aquifers, transmission lines, and water distribution networks in Sharjah.

In 2018, Sharjah Electricity & Water Authority has started an energy efficiency program in line with the vision of the Ruler of Sharjah Emirate H.H. Dr. Sheikh Sultan Al Qassimi for Sharjah to become the UAE's "City of Conservation". The objective of the program is to reduce the consumption of Power & Water, starting from the generation and desalination plants towards transmission and distribution network. In addition, retrofitting buildings in Sharjah city will help to facilitate the reduction of consumption and will support our commitment as a utility provider to meet the demand. The total electricity demand for Sharjah during 2018 was 12600 GWH with a total water demand for the same period of 27816 Million Gallons (MG) and the total gas consumption of 80.344 Million Cubic Meters. Experience from projects already undertaken show that we can easily save between 25% to 30% of the annual consumption in buildings, bringing significant costs savings.

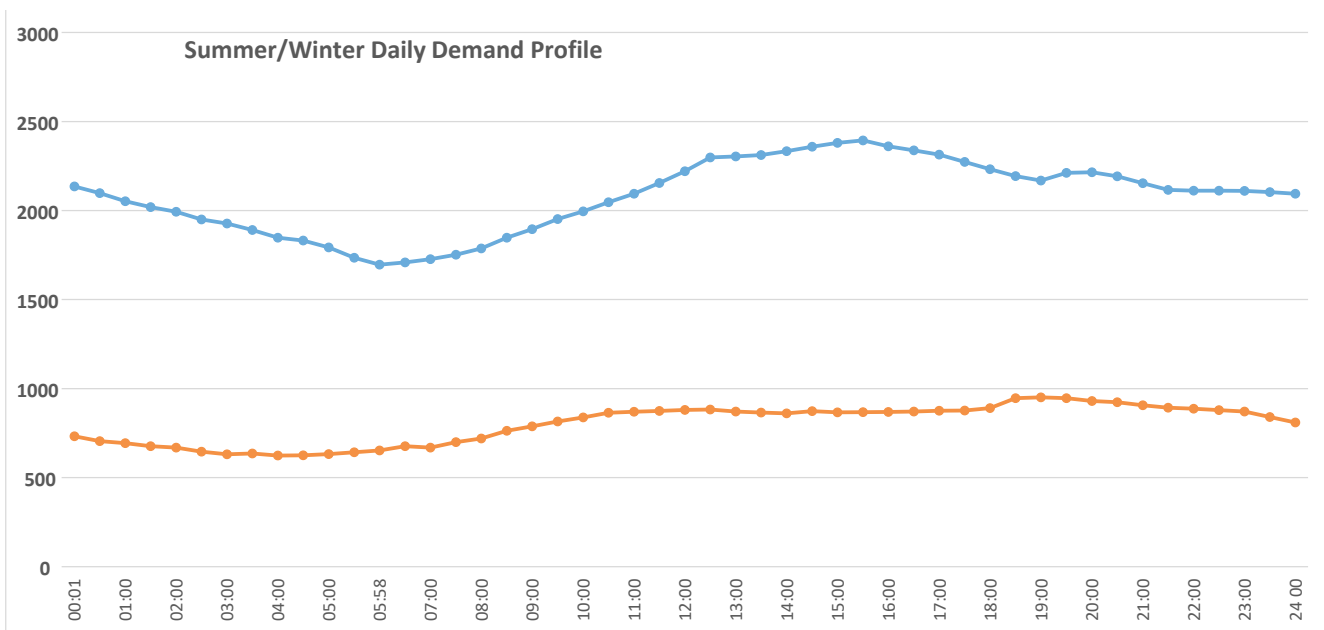
A retrofit program has been launched as a part of the energy efficiency program and covers two areas: in-house facilities & consumer facilities. It's very important to 'walk the talk' and show the consumers that we are committed to retrofitting our facilities too.

From the consumers side, the program focuses on the highest consumers in the city "The Top 100" companies that utilise most of the electricity and water usage in the SEWA's network. Out of this category, 41% are from the industrial sector, and the other 59% consists of government and commercial sectors. SEWA is engaging continuously with the "The Top 100 consumers" to increase awareness regarding energy efficiency and its benefits. SEWA helps many of these in conducting free energy audits to identify measures to reduce their electricity consumption and the corresponding costs.

The first step that was taken after identifying the "The Top 100 consumers" was to replace the old mechanical meters with new smart meters, free of charge (funded by SEWA). Most of the meters were in use since the 1970s and 1980s. This project gave an impact of getting accurate consumption data which was less than half when compared to the reading from the mechanical meters. Now, more than 30,000 consumers already have smart meters. In addition, this raised a warning alarm for the consumers to look at their real consumption and start acting.

At this stage, SEWA was ready to receive a request from the consumers to deliver an energy audit service in order to let them understand their consumption and identify energy saving measures. This was an innovative way of





— Peak day MW demand of entire Sharjah in Summer (20/06/2019)  
 — Minimum day MW demand of entire Sharjah in Winter (09/02/2019)

changing the consumers' behaviour and to attract them to be a part of our strategy. Convincing our consumers to undertake a retrofit project is a win-win-win situation, SEWA will meet the demand by supplying its services in the best and most efficiency way, consumers will be satisfied after reducing their consumption and increasing the efficiency of their facility.

We are further assisting the "The Top 100 consumers" in identifying technology suppliers and ESCOs which could assist them technically and financially in implementing the energy efficiency measures. We encourage the international and national ESCOs to join Sharjah Market which will impact on the economy, increase competitiveness and create new jobs and innovative solutions. SEWA acts as a bridge to connect ESCOs and our consumers while ensuring that only qualified and experienced ESCOs enter the Sharjah market.

New buildings are being considered in the program through several initiatives that apply when the consumers request to get a new connection service of Electricity, Water & Natural Gas. For instance, in the process of the design approval, the consumer can get free consultation service to look at a proposed load and water capacity and study the opportunities of reducing right from the beginning and applying the best practices of energy efficiency in buildings.

SEWA supplies several electrical, water and gas components that comply with high international standards that the consumers can easily adopt rather than search for the best in the market, for example: capacitor banks & distribution panels. In addition, some high-efficient appliances also qualified to be supplied to the consumers, such as: LED lighting, solar water heaters and pumps.

### Effectively improving energy efficiency through three key areas

Green Growth & Sustainability has been taken as an approach at SEWA. This approach has three main aspects: social, environmental & economical. SEWA supports the highest 100 consumers in the city of Sharjah by introducing the retrofit program that targets commercial, industrial, Government & residential sectors. The program starts with an energy walk through audit (free of cost) conducted at the consumer's facility to give an overview of the building's electricity and water consumption with the aim to identify measures to reduce the water and electricity usage. In addition, SEWA is impacting the construction sector in Sharjah by mandating the use of energy and water efficient fixtures.

Energy efficiency must be more than a slogan. It creates a win-win-win situation, by fighting global warming, creating new jobs, increasing the competitiveness of companies in providing the best solutions for the customers. As the utility provider, we have created the mutual benefit bridge that will reflect positively on all the parties, either customers or companies. In the end, SEWA shall provide the best out of the best for its consumers to achieve customer satisfaction.

### The biggest energy efficiency projects implemented so far

SEWA understands the impacts of global warming and climate change, and the role we must play as the utility provider. Our subsidiary Zual Water Factory became carbon neutral by reducing and offsetting all of its greenhouse gas emissions (GHG). Starting in 2017, SEWA's Zual Factory has pledged to measure, reduce and offset its GHG emissions. This initiative is called Climate Neutral Now and belongs to the United Nations Framework Convention on Climate Change. In 2017, Zual was able to offset 2710 tons with Certified Emission Reductions (CERs). In 2018,

Zulal was able to offset 4550 tonnes with CERs, and SEWA looks forward to continuing to offset emissions to aid renewable energy projects around the world.

In 2018, more than 40 retrofit projects have been implemented in the Sharjah emirate which covered all building categories and had total energy & water savings of 60 MWh & 9 million Gallons respectively. An example would be a retrofitting project at Al Falaj pumping station which achieved a saving of 46.5% in electricity use. We've also worked on retrofitting more than 4200 of conventional streetlights to LED and installing solar streetlights in the rural areas which save the cost of cabling as well.

In SEWA's facilities, several projects were implemented in order to increase the overall energy efficiency and to sustain the network. The pumps retrofit in the desalination plants and pumping distribution station was one of the important projects that is still under progress. Some pumps were from the 1980s and replacing those saved a lot of energy and enhanced the system efficiency. Retrofitting water pipelines which were in the network for more than 30 years was another milestone.

In 2018, SEWA also launched the Green Billing Initiative in line with the energy efficiency program and the environmental impact of paper, as a result we now have a paperless billing process in operation where all bills are shared through emails, SMS, website and an App rather than printing millions of paper bills. Furthermore, the SEWA App is a gateway for the consumers to proceed to payment, for checking their historical consumption data, and the carbon emitted through their consumption.

Regarding new projects, SEWA has added a couple of regulations that support the Energy Efficiency program. For example, LED lighting is mandatory to be installed in all new buildings/facilities in the Sharjah city in order to get the electricity, water and gas service connection. Similar, SEWA looks at other regulations that shall bring the best practices in green buildings and sustainability. And finally, SEWA is responsible for the street lighting in



the city and we are honored to be the leading city in the whole of UAE in covering the longest distance of solar LED streetlights. More than 70 km was covered, and more than 700 MW was saved in 2017, with the project still in progress.

### Encouraging customers to reduce their utilities

We are always active when it comes to spreading awareness in terms of energy and water conservation. In 2017, SEWA reached 2.5 million people by using various channels, strategy which consisted of media channels, social media, emails, SMS, training, lectures and many more. The Peak Hour is the one-hour power saving on July 1st (2.30pm to 3.30pm) which is one of several conservation initiatives launched by the SEWA where the public as well as businesses are urged to switch off all unnecessary devices during that hour.

SEWA's goal is to bring about a sustained change in consumer behaviour and energy efficiency practices and achieving the consequent reduction in resources used. SEWA's approach is innovative and unique, especially because there is no regulation to mandate the consumers to enter the retrofit program. After showing the consumers the potential of saving in their facilities through our free energy audit service, by default they will start looking at the right way to reduce the consumption. On the other hand, SEWA will get benefits from the saved energy of the retrofitted buildings and will be able to supply it to new consumers. SEWA hopes that this approach will bring tangible results rather than the conventional way of spreading the awareness through lectures or brochures.

### SEWA's energy management short-term and long-term plans

To share an example of the short-term plan, SEWA is aspiring to make its HQ into one of the smartest offices in the world by collaborating with global partners. Whilst in the long-term, one of the main targets is to retrofit all the existing facilities of SEWA which will be an excellent showcase for demonstrating our energy efficiency commitments as a government utility.

Concurrently, SEWA will continue supporting the optimisation of the energy and water consumption at the customers' facilities and initiating a variety of services to spread the culture of energy efficiency & renewable energy. Once the energy is optimised this will allow SEWA to introduce and integrate the renewable energy to the grid.

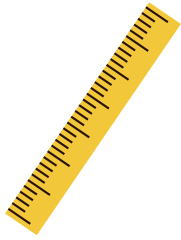
### Author's profile:

His Excellency Dr. Rashid Alleem, the knowledge Ambassador of the UAE, is the Chairman of Sharjah Electricity & Water Authority. He is an honorary speaker and the author of several books on management, leadership, and sustainability. In 2016, His Excellency had won the 13th Middle East CEO Excellence Award and he had also been decorated with the coveted 2013 Extraordinary Human title by the United Nations World Peace Organization.



# SECR COMPLIANCE

## How can the EMA help?



### Evaluation Tool

Capture your data to create compliant and standardised reporting



### Compliance Course

One-day training to learn SECR essentials and how to report



### Advice

Energy Management professionals who can assist with compliance



Streamlined Energy & Carbon Reporting is a requirement introduced in April 2019 mandating that large UK companies must report annually on:

**Energy Consumption**  
**Carbon Emissions & Intensity**  
**Energy Efficiency Actions**  
**Methodology Used**

**Get in Touch:**

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# Energy Management Team Interview



**As part of our series on energy management teams and their work, we have asked the Nottinghamshire County Council's Energy and Carbon Management team about their approaches to energy management and achievements.**

## Energy management at NCC

Like energy management functions in many organisations over recent years, our focus in Nottinghamshire County Council has been the contribution we can make to



Team Manager - Philip Keynes

supporting our organisation's financial position; a position where we have needed to find significant savings to meet the growing costs of care for vulnerable young and elderly people against a backdrop of reducing central government support. Our team has contributed not so much through grand policies and strategies, but rather through a mixture of sensible investment, good procurement, professional and friendly support, and what can feel like constant nagging! It can be hard trying to make energy everyone's concern when the reality is more often that it is just nobody else's priority!

Having said that, climate change and other environmental issues are now back more firmly on the Council's agenda, thanks mainly to a wave of local climate emergency declarations, youth climate strikes and now a national commitment to net zero emissions by 2050, which has given renewed impetus to our work and added resonance to our communications.

## What we do

Our small team includes a team manager and four energy management officers who all provide a comprehensive energy management service to schools and Council services, including many academy schools and new Council owned businesses, and private sector partners delivering services on our behalf. As a team, we

don't pay the utility bills, but we do look after the supply arrangements and associated services such as meter operation and data collecting. Schools and arm's length organisations access our energy supply arrangements through an evergreen participation agreement, benefitting from our choice of buying baskets and the value offered by our chosen central purchasing body, as well as the additional services we offer.

Our service offer to our sites and schools includes energy surveys, access to finance, a bureau service, a web-accessible energy manager tool, Available Supply Capacity checks, and value for money meter operator and data collector contracts. Plus general support and advice around all things related to energy and water supply and consumption. We produce a regular newsletter, Carbon Copy, with news, case studies, top tips, etc, and generally aim to look after others' energy spend as if it were our own.

A managed Display Energy Certificate compliance service is also available to schools through a separate participation agreement.

## How we work

Whilst as individuals we have strengths and weaknesses and particular areas of responsibility, we try as a team to ensure we can all help our customers with whatever they need, whoever they are – we don't limit ourselves to particular customer groups, or utility types, and we all look to own any request from schools and Council sites, and draw on pooled knowledge to provide the best response that we can. We aim to make ourselves helpful, useful and a team that others are pleased to work with.



Energy Management Officers (from left to right) – Andrew Pooley, Martin Trowse, Emma Piggins and Nick Stendall

## Estimated savings achieved by Nottinghamshire County Council\*

Recycling Fund Size <b>£1,500,000</b>	Annual £ Savings <b>£950,045</b>	Total Project Value <b>£4,038,257</b>	Fund Started <b>2006</b>
Salix Contribution <b>£750,000</b>	Lifetime £ Savings <b>£14,662,957</b>	Annual CO2e <b>4,440 tonnes</b>	Average Project Payback <b>5.2 years</b>

\*Calculated using emissions factors published by government for carbon footprinting.

### Rol

During the past 8 or so years we've helped the Council to invest significant sums in energy efficiency and renewable energy, including £1.8m in 40 PV arrays across our offices and other buildings, amounting to over 1MW of installed capacity; £2m in biomass boilers to replace ageing fossil-fuelled plant in schools; and over £7m in energy efficient street lighting.

Through our 15-year-old partnership with Salix Finance, we have supported over £1.9m worth of energy reduction projects across 78 schools. Popular projects have included LED lighting upgrades, new Building Energy Management Systems (BEMS), boiler replacements and improving building fabric insulation. These projects are estimated to save the schools over £460,000 and 2,700 tonnes of carbon each year. Over the lifetime of these technologies, the schools are expected to save over £5.9m on their energy bills.

In street lighting, the same partnership has helped achieved

a 36% reduction in energy consumption across the lighting portfolio in 6 years (some 15million kWh!) through LED installation and dimming programmes. The project has also benefited residents by providing improved lighting to roads and footpaths.

All this investment has helped play a part in reducing carbon emissions from energy use in our buildings (excluding schools) and street lighting from 46,886 tonnes in 2010-11 to 18,880 in 2017-18 – a 60% reduction.

### Costs

Energy and water cost the Council about £6m p. a., with schools on our supply contract arrangements spending another £9m or so on energy.

### Are we celebrated or acknowledged?

Our achievements are recognised by partners, such as Salix Finance, with whom we made significant

investments in energy efficiency measures in street lighting, schools and offices.

We also receive a lot of positive feedback from our services and schools. But whilst our achievements are arguably impressive, holding on to resources for energy management can still be challenging when faced with what has become the annual round of saving targets. Part of that problem perhaps lies in the Council having decentralised utility spend – so the true cost of energy and water is spread across numerous budgets and yet in total is many times greater than the cost of our service. However, a proposal to centralise those energy budgets within our team will help reaffirm the positive impact we have on the financial and environmental sustainability of the Council and acknowledge that reducing the team budget is a false economy – taking financial resource away from our service is likely to lead to increased costs and reduced income to the Council as a whole.

We recently participated in an in-house commercialisation exercise, aimed at getting service areas to

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think in a more business-like way. As part of this we were able to demonstrate our worth to senior managers. For example, annual income associated with our service is about £700,000 p.a. - from calculated savings from energy efficiency investments, FiT payments, RHI payments, commission on energy supplies to schools, and a few other bits and pieces. That's without all the harder to quantify benefits of just doing our best to keep an eye on everything – maintaining the portfolio, spotting potentially wasted 'out of hours' energy consumption, switch off campaigns, etc.

### How we communicate

We only have a small revenue budget, so communication is largely through existing channels, other than our twice-yearly Carbon Copy newsletter. Our latest campaign has been a 4pm Power Down, where we have been encouraging staff to reduce electricity use after 4pm, by doing things like:

- Running laptops off batteries;
- Avoiding use of multi-functional devices and printers until the

- following morning;
- Using stairs, not lifts;
- Switching off properly before leaving the office.

Messaging to reinforce this campaign is timed to coincide with TRIAD warnings from our electricity supplier, so we hope this should have a positive impact on DUoS and TNUoS costs, as well as on overnight and weekend baseload.

### Training and professional development

Recently we decided we would all look to become members of EMA to support our work and help enhance our offer, particularly by providing access to training and development opportunities. This led to an in-house EMA energy auditing course, which was very well received and good for both team building and personal professional development.

### Future plans


We are just at the start of implementing an energy strategy, working with colleagues in FM

to achieve savings in energy consumption across our major office sites, which together account for about 50% of the Council's energy spend. The strategy involves 3 broad areas of activity: changes to site operation and management; employee awareness and engagement; and infrastructure investment. Linked to this is the completion of a project to upgrade and network BEMS across these office sites and an exercise to consider the merit of centralising energy and water budgets.

Since embarking on this, the Council has passed a motion committing it to develop a corporate environment strategy, to be informed by the latest IPCC report and national policies on climate change and giving consideration to a zero-carbon target. So, we may well find our energy strategy being extended in scope and ambition before long – exciting and challenging times ahead! We are looking forward to playing our part in the transition to a zero carbon UK.







Distributed Energy Future Trends

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What does it take to become a more sustainable, future-focused organisation? Our new report explains what it means to be a sustainable business and the steps you can take to start your journey.

We share the most significant results from our research, the changing role of energy, and the actions businesses should take to prepare for a more commercially and environmentally sustainable future.

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**Practical Guide for  
Energy Management  
Professionals**

# ENERGY AUDITING



**“Putting Energy  
Management at  
the Heart of  
British  
Business”**

**Energy audits can be carried out for a number of specific purposes or reasons, both financial and environmental. An internal audit could be used to identify a potential program of efficiency projects or just to understand how a building or process is currently operating and its costs. An external independent audit may be required if a building is not performing to its expected capability or if the required expertise is not available internally. An audit may also be required to meet a legal obligation such as those under the Energy Saving Opportunity Scheme (ESOS) where audits are required every 4 years.**

Whatever their end purpose, an energy audit is a review of energy consuming equipment within part or all of a building or a specific process in order to assess how installed systems and processes are currently operating and whether there is an opportunity to improve performance through optimisation, upgrading or total replacement.

The process of carrying out an audit will be similar in most cases regardless of the size of building or the equipment it contains. Although they may be different in scale and technical requirements, the process for auditing a whole building or a single industrial process will also be very similar.

### **Audit scope**

One of the key aspects of a successful energy audit is to agree on its scope before commencement. It is essential to establish exactly what the purpose is of an audit and hence the required outcomes and report style. For an internal audit, in theory the auditor should be familiar with the need for the audit, what is trying to be achieved and the required outputs in terms of information and financials.

For an external audit, an auditor will need to understand the client's purpose for the audit, what buildings, areas or equipment is to be included, what outputs are required and any additional, relevant information such as the payback criteria that would ideally be considered for a project, the type of report to be produced, financial information, its level of detail and level of technical information etc. A kick-off meeting

is always useful to establish these requirements and ensure the audit produces the required outputs.

### **Site access**

Before attending site, the following items should be considered:

- Do you need to produce a method statement and risk assessment for your audit and provide them in advance? These can be generic ones used for all audits but a site-specific risk assessment should be added once you are aware of any additional risks when arriving on site, such as if there are multiple fork lifts moving around. An auditor should always be equipped with basic personal protective equipment but should ensure they are aware if anything additional or specific is required
- During the audit, safe access will be needed to all areas of a building in order to inspect any energy using equipment that may be found so the building occupants need to be notified in advance. Auditors may need to access sensitive areas or those where production takes place so make sure you are aware of any restrictions to your audit or equipment you may need to take. For instance, there may be health restrictions in place in food manufacturing environments
- Ideally, an auditor should be accompanied by a member of site staff who has the requisite skills to show you the areas that need to be visited and who can answer any questions that may arise, especially if it is an unfamiliar building. They should be able to explain things such as how the building operates, its occupancy levels and times and the basic functions of any equipment that may be seen
- An auditor may need to access items such as a building management system (BMS) to understand the control settings and operation of certain equipment so ensure a suitably qualified person is available.

### **Initial data analysis**

Before attending any site to conduct

an energy audit, it is always good practice and can be very informative to find out as much basic information about a building as possible. The basic building use, its operational hours and any specific processes that take place in it can all help give an understanding. For example, a standard office building might expect to have 5-day week use with regular office hours, giving a good guide to when it would be expected for energy use to take place. A manufacturing site may have 24-hour use if shift patterns are worked but energy use may vary on production runs etc.

Ideally, you should start an audit with some familiarity about a building's general use and occupation and potentially already have an idea of consumption patterns and questions that these may raise as sometimes it is possible to take corrective actions during an audit. If data is not readily available then the audit will have to be based more on what is seen during the on-site process.

**This article is an extract from the EMA Guide to ENERGY AUDITING. The full version of the Guide for energy management professionals is available on the EMA website in the Resources section. It includes further sections outlined below and practical examples throughout.**

- **More on Initial Data Analysis**
- **Conducting an audit of**
  - Control Systems
  - Lighting
  - Heating Systems
  - Cooling Systems
  - Ventilation Systems
  - Pumping Systems
  - Compressed Air
  - Other opportunities:
    - On-site Generation,
    - Human Behaviour,
    - Metering
- **Calculating Savings and Return on Investment**
- **Reporting**
- **Prioritising Opportunities**

If you are interested in learning more about energy auditing, the EMA is running an Energy Auditing Techniques course on 13th November in London.

For more information about the guide or course, please contact [jana.skodlova@theema.org.uk](mailto:jana.skodlova@theema.org.uk) or call 0203 176 2834.



# What's Stopping You?

**Purchasing decisions for capital investment projects in a business are rarely signed off by just one person. At any given time there are likely to be several potential investment options available, with each department having their own ideas as to where spend should be allocated. Even the most well intended proposal can be rejected out of hand if certain stakeholders do not fully understand or appreciate a problem, its solution, or the subsequent benefits. This can make it a challenge for energy managers to win over colleagues when investing in energy saving initiatives, particularly when it comes to upgrading equipment that typically operates behind the scenes.**

There are an estimated 10 million electric motors installed in the UK, accounting for a quarter of all electricity used in industry<sup>1</sup>. More than 90 percent of these motors are run with no variable speed control. And while not all motors can benefit from variable speed control, the vast majority can, presenting a huge opportunity to save energy.

Energy efficiency can sometimes suffer from being disconnected from the strategic aims of business. Employee wages, for instance, typically comprise a far larger proportion of overall operating costs. When looking for ways to save money, there can be a perception that improving energy efficiency will make minimal difference to the overall balance sheet, if at all.

Even when there is investment in energy saving, this tends to focus on more visible improvements like LED lighting and building management systems (BMS), or modifying employee behaviours, rather than motor-driven applications hidden away in plant rooms.

In many companies, only a small number of employees will be able to tell you anything about the electric motors

used in a facility, let alone how many there are, where they are installed, how they are operated and, crucially, how much energy they use. In commercial buildings for example, motors are rarely seen or heard unless something has gone wrong. To that end, variable speed drives (VSDs) are not generally front of many employees' minds when it comes to energy saving initiatives.

This lack of awareness means that companies could be missing out on the significant energy savings that VSDs can deliver. It is, therefore, important that energy managers are able to build a compelling business case so that others can understand the potential benefits.

## Building the business case

VSDs not only significantly reduce energy costs with comparatively little investment, but also provide additional benefits for other stakeholders. Furthermore, with some government energy efficiency schemes like Enhanced Capital Allowances (ECAs) soon to be discontinued, time is running out to achieve maximum return on VSD investment.

In building a compelling business case, an energy assessment is one way of getting the relevant information to the right stakeholders. This is an appraisal of your installed motor-driven applications, focusing primarily on variable torque applications such as centrifugal fans, pumps and compressors.

Some VSD providers will carry out such an assessment free of charge, subject to terms and conditions, and it takes place over the course of just half a day. In some cases they may even be able to provide a trial, whereby a VSD is supplied on a short-term basis to determine actual VSD performance in-situ on a given application.

<sup>1</sup><https://www.theccc.org.uk/wp-content/uploads/2017/03/Energy-Prices-and-Bills-Committee-on-Climate-Change-March-2017.pdf>

## Crunching the numbers

An energy assessment provides the hard proof required to bring all stakeholders on board. The finance department, for instance, will generally have little interest in how a VSD works, or technical details like power curves and the cube law, but it is interested in how much money it can save. There are countless examples of real-life success stories which can be used to prove the case, across a broad range of industries and applications.

CBRE, a building maintenance contractor, undertook an energy assessment at a 17 floor, 46,500 square metre office development near Canary Wharf in London. When the building was completed in 1989, only the most energy intensive applications were speed controlled.

Some 20 years later, CBRE was keen to improve energy use on other applications including hot water and chilled water pumps and air extraction systems. 18 VSDs ranging from 5.5 kW to 37 kW were installed resulting in a saving of £15,000 on electricity costs within six months of commissioning, with a payback time of 18 months.

Anglian Water asked its VSD supplier to perform an energy assessment on pumps controlling reservoir boreholes at two sites in Suffolk. It was found that the actual demand for pumping capacity was some distance lower than what the borehole was actually delivering, with no means of slowing the pumps down to adjust flow rates. A 132 kW drive was recommended, which also built additional redundancy into the system, improving reliability. Anglian Water is now saving £2,000 a year on electricity costs, with the £7,000 project investment expected to pay for itself within three and a half years.

Bedford Hospital discovered, thanks to an energy assessment, that it could save £15,000 a year on air handling costs with the installation of four VSDs. In fact, while the energy assessment predicted a speed reduction of 15 percent, the actual reduction was 20 percent, with reduced running noise and maintenance requirements thanks to the reduction in wear on components. Payback time was around one year.

Bourne Leisure, which owns several national hotel and leisure brands, saw how successful VSDs had been at one of its swimming pools, and wanted to see how much energy saving could be attained at another pool elsewhere. The predicted energy savings of £4,899 per annum identified in the assessment were exceeded once the installation was complete, giving a payback of less than six months.

Greenwich University conducted energy assessments on air handling units at three campuses in an effort to reduce its energy bill while cutting CO2 emissions. A total of 44 installations were identified that could benefit from VSD installation, equating to £10,472 a year in energy savings, while reducing carbon emissions by over 57 tonnes per annum. Further projects were identified beyond the initial rollout that are predicted to achieve additional savings of £4,000.

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### Finance & compliance

The financial department needs to know what the value of an investment is, and its expected return. On a typical fan application a VSD will recoup its upfront cost within two years, but this can be as little as six months. Once the payback time has been reached, the drive will continue to deliver cost savings in perpetuity compared to a motor run without a VSD.

Schemes like ESOS and SECR can also be leveraged as part of any VSD investment proposal. These schemes are widely considered to be well intentioned, but some have criticised the lack of incentive to actually implement any energy saving opportunities identified in any reports. VSDs are exactly the kind of low hanging fruit that these schemes are designed to encourage. Indeed, VSDs from several manufacturers are included on the Carbon Trust's Energy Technology List (ETL), which allows companies to claim tax relief as part of the Enhanced Capital Allowances (ECA) scheme.

### Maintenance and operations

As well as reducing energy, VSDs can also enhance productivity. The precise motor speed control provided by a VSD means that ramping up and down is much smoother, preventing jolts on start up and shutdown, or when transitioning between different speeds. PID control is a feature which provides constant feedback to ensure that a motor is operating at the correct speed at all times regardless of conditions, ensuring that HVAC systems accurately maintain the required temperature, for example.

The smoother motor operation achieved by a VSD reduces the strain on components like gearing and bearings, and can ultimately reduce the need for motor repairs, limiting the cost and frequency of downtime. This frees up maintenance engineers to concentrate on other priority tasks.

### Big data

The biggest leap forward in VSD technology in recent years is the digitalisation of the powertrain. A powertrain comprises a VSD, motor, bearing and load, be it a fan, pump or otherwise. Traditionally, mechanical items like motors, bearings and the load would require manual visual inspection to check their status and condition. Smart sensor technology now allows parameters to be monitored in real-time to provide enhanced performance and energy efficiency data. This data can then be turned into meaningful information, and displayed to the relevant persons in a format they can comprehend. This means that the energy manager can see at a glance how much energy an application is saving, the financial officer can see the monetary savings in real-time, while the maintenance manager can see where action is required to prevent breakdowns.

### In conclusion

Manufacturers are increasingly recognising that many stakeholders in the decision-making process do not know nor care how a VSD works. An energy assessment means that they don't have to. The bespoke nature of an assessment, which is carried out on-site on real applications, means that stakeholders can see exactly what the actual impact will be, how much money will be saved, and the likely payback times. With employees at all levels of organisations increasingly being required to squeeze more out of less, VSD manufacturers are equipping energy managers with the tools to help build a consensus on energy saving investments, and expedite upgrade processes.

### Author's profile:

Steve Hughes has worked in ABB for 23 years in sales and channel management roles for both variable speed drives and instrumentation products. Whilst working in the drives business Steve was an integral part of ABB's energy efficiency campaign when it began almost 20 years ago in the year 2000.



Lack of awareness of VSD technologies means that companies could be missing out on significant energy savings

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# Save the date for EMEX 2019!

**2019 could be one of the most significant years to raise awareness of energy efficiency in businesses, with continuing technological progress and some important policy changes.**

Here are a few topics to be addressed this year at EMEX on 27 and 28 November:

## 1. Streamlined Energy & Carbon Reporting

In April of 2019 the UK government's new Streamlined Energy and Carbon Reporting framework came into effect.

If you haven't heard of Streamlined Energy and Carbon Reporting (SECR), you are not alone. Although over 10,000 companies will need to start collecting data and reporting on their energy, emissions and energy efficiency measures, there has been little publicity on the regulations. If you have undertaken CRC reporting then the emission element is broadly similar, however around seven thousand companies in scope will not have reported before. The EMA has been involved with the development of SECR from inception and views it as an excellent opportunity for increasing the importance of energy management in the UK's largest companies. The final report is a public document which in the future could be seen as not only a means of measuring

a company's emissions but a barometer on their climate change reduction credentials. Financial institutions and shareholders will use the report to gauge the risk profile of companies that ignore energy as a major financial risk.

## 2. Road map to Net Zero

The Climate Change Committee (CCC) recently published Net Zero, which sets out a science-based road map to carbon neutrality for the UK by 2050. The scale of this task is not insignificant but unlike many previous reports, the imminent threat of irreversible climate change means that organisations are starting to question how they can reach Net Zero.



As all energy managers know, there are a lot of moving parts and a number of trade-offs that will need to be made to get the lowest carbon

footprint possible. An inconvenient truth is that some of the solutions set out in the CCC report are based on technologies that do not exist at scale, at present, and will need to be incorporated when available. Whilst this is a thirty-year journey the major savings will need to be implemented in the short term. The plan drawn up excludes offsets but does include the purchase of green energy with caveats. The elements of the plan are based on the EMA SECR methodology.

## 3. ESOS Phase Two

We are now in Phase 2 of the ESOS compliance scheme so let's recap some facts. The ESOS Regulations 2014 is a reiteration of the Article 8 of the EU Energy Efficiency Directive and mandate that large organisations in the UK undertake comprehensive assessments of energy use and energy efficiency opportunities at least once every four years.

If you are unsure if you qualify for ESOS, refer to full ESOS guidance, which includes additional information on how to assess if your organisation qualifies.

In order to comply with ESOS, the large UK organisations are required to take some important steps before the compliance deadline of 5 December 2019. ESOS is part of British law so even a hard Brexit will not change the requirement to report.



#### 4. Electric Vehicles

Electric Vehicle (EV) tech is improving and for those who own one the driving is great.

Against the backdrop of improving technology and accelerating climate change, the UK Government has published its Road to Zero Strategy, which foresees that a third of the UK's fleet on the road in 2030 will be electric. The government has also vowed to end sales of internal combustion vehicles in the UK by 2040.

This is an optimistic prediction considering 2030 is only eleven years away. Furthermore there is a problem with zero emissions at the tail pipe, as the energy must be provided by the grid and the resulting load will not be inconsiderable.

There will be a huge increase in the number of electric vehicles on the road, but the charging infrastructure needed and local power constraints which will kick in with mass

ownership will be a real headache.

These increases in EV charging demand will have to be managed by better consumer engagement, smart-charging technology, and other innovative vehicle-to-grid solutions at scale.

#### 5. Battery Storage

This is one area that could become really exciting because you could benefit from hosting batteries. Work is being undertaken to allow DNOs to source contracts for battery services in the area of Demand Side Response. Simply put, the DNO could work out the cost of upgrading, reinforcing or building in resilience and instead of building new substations, they could meet their requirements by contracting out demand reduction services through contracts with independent aggregators.

The aggregators would install batteries at large sites that use power at peak. Energy stored off peak would be used to reduce power.

The demand reduction would not require the site to reduce energy use but use the stored power thereby reducing demand from the grid. Such contracts could help sites, through load shifting, turn peak time use into a profit centre.

2019 could be a great year for our profession and for our credibility within our organisations, as energy efficiency becomes a Board agenda item.

The legislative landscape in 2019 has aligned to put this high on the Board priorities and more importantly, there is a realisation that cost management and changing consumer focus are adding greater importance to this area.

**We look forward to meeting you all at EMEX on 27 and 28 November in London where the mentioned topics and many others will be addressed, and the latest energy efficient products and services will be showcased.**



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# Spotlight on...Net Zero

**In a relatively short space of time, the phrase 'Net Zero' has become a fixture in the English language, thanks to the ground-breaking announcement the UK will be the first major government to legislate to reduce carbon emissions to net zero by 2050.**

So, as we await further detail from the new government on how net zero will be reached, it's worth looking at the action's businesses can be taking to reduce their own energy consumption and carbon emissions.

## What can businesses be doing now?

- **Get savvy with SECR**

– the opportunity for 11,900 qualifying businesses to go beyond the 'box ticking' and really use Streamlined Energy and Carbon Reporting (SECR) to instil lasting energy efficiency changes in their organisations.

For businesses that do not qualify, the principles of SECR can provide insight into their consumption and emissions and by installing effective energy reduction measures, it

makes long-term financial – and reputational – sense.

- **Review your energy strategy** – looking at opportunities to sourcing power from renewable sources as well as sleeving long term renewable energy through a Corporate Power Purchase Agreement.

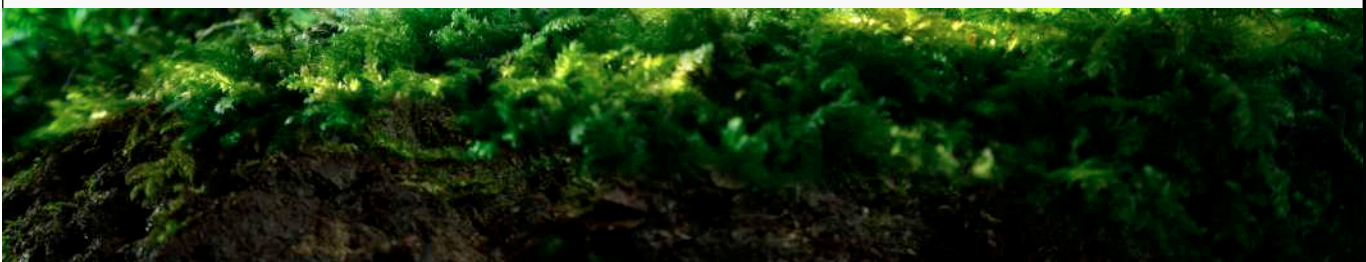


- **Consider onsite generation** – installing your own on-site generation assets can not only help to cut carbon emissions, but also help to mitigate the effects of higher energy costs on the bottom line.

The cost of decarbonisation will undoubtedly have an impact on energy bills,

so from taking a more flexible approach to procurement, to boosting energy efficiency, there are numerous ways businesses can take control of their energy strategies and start to really play their part in the net zero mission.

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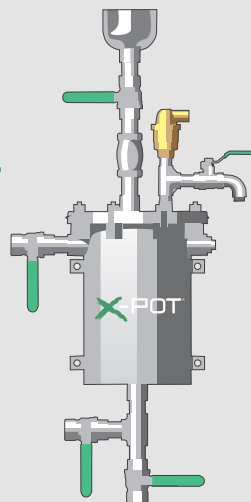


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