THE EMA MAGAZINE

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TO DECENTRALISE OR NOT TO DECENTRALISE?

CLIMATE CHANGE ECONOMIC INCENTIVES

their successes and failures

CAREER INTERVIEW

with Dewi Day

ENERGY BROKERS

heroes or villains?

EMPLOYMENT AND PAY GAP

EMA survey results – follow up

ENERGY PERFORMANCE CONTRACTS

How to make them a success

BUSINESS CASES

How to develop and successfully present them

contents

INDUSTRY FOCUS

by FIONA DALY
National Sustainability Lead at NHS Improvement

Welcome...

The NHS is facing unprecedented challenges; from an increase in demand on its services — **the NHS sees a million patients every 36 hours and today carries out 40% more operations than they did a decade ago** — to the significant financial challenges it faces. The estate housing this critical clinical infrastructure spans across 26 million square meters and is formed of more than 1,200 hospital sites, 7,600 GP practices and 100 independent provider sites. With an estimated value of £42bn; 18% of sites pre-date 1948 and almost the same again is being built between 2005 and 2014. This portfolio has an equally challenging backlog maintenance bill of £5.3bn.

In 2016/17, the NHS in England spent £628m on utilities; £544m on energy and a further £84m on water. Responding to these challenges, however, presents exciting opportunities for NHS energy managers and those working across industry.

Whether that be through reducing demand; maximising the use of technologies, improving BEMS controls and considering whole life costing during procurement to building onsite power generation capacity, or standardising Combined Heat and Power (CHP) and onsite renewable generation, the energy managers need to have the skills and knowledge to push these projects successfully through their organisations.

The articles in this issue provide helpful tips on the journey to creating healthy, sustainable and resilient estates.

Enjoy…

THE EMA MAGAZINE

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by MARK TAYLOR
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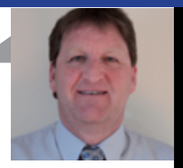


Energy Brokers, Heroes or Villains?

How many times do you get a phone call that starts "I can save you money on your energy and gas bills". I always ask "how do you know when you don't know what I pay now"! Although many areas of the energy industry tend to receive a mixed press, one area that always seems to produce strong views is that of third party intermediaries or brokers who are usually the people on the end of these calls. There are many horror stories about brokers and in fact, during a recent exercise, the EMA gathered a disturbing number of examples of very poor and essentially underhand behaviour by them. But what is the truth about the brokerage industry?

As in other industries such as insurance, a good broker can help clients immensely with what can be a complicated and time-consuming process. Ideally, they could gather site data, issue termination notice, conduct a good tender with a range of suppliers, obtain prices and present them to a customer with advice on the offers. They should also follow sites through any change of supplier, dealing with problems that may arise and generally removing all the hassle from the customer.

However, in reality many brokers just want your signature on a contract, do not understand or care about the issues or undertake the tasks poorly, leading to many of the wild promises that are made, the misleading information and the poor service that is sometimes provided.

Unfortunately, as an industry, energy brokers are currently not regulated and, in my experience, a large proportion tend to be more interested in just getting access to the site data of a business and a signed letter of authority rather than proving their credentials and offering good service. You may well have been offered a "free health check" or something similar which may appear innocent and quite useful. However, what brokers really want is a copy of your bill which provides them with all the site information they need, including your all-important contract end date which they can then use to contact your business year after year at just the right time. This can lead many to operate with high pressure sales tactics to obtain this valuable site information. Some very unethical brokers may also use the tactic of claiming to be working for or on behalf of a supplier, trying to make businesses think they are talking directly to their supplier and unwittingly signing up for a deal they did not want.

So what can you do to try to filter the bad brokers out without spending a huge amount of time on the process? My advice is to always ask a few awkward questions to see what they know and how much information they are willing to give. A good broker will always give honest answers and provide all the information you request while the poor ones will probably wander off into a sales pitch and be unwilling or unable to provide sensible answers. The following areas may give you a start.

Commission structure

You may quite often be told there is no charge for a broker's services but they really just mean you will not pay them directly. As nobody works for free, how do they make their money? Most brokers operate on a commission structure where they are allowed to add an uplift to the price customers are charged on their bill. For example, they may add 0.4 p/kWh commission to the rate quoted by the supplier and this total rate appears on your bill but with no indication how much is commission. The supplier then pays the broker their commission directly.

To give this some real numbers, for a relatively small site using 100,000 kWh of energy per year, this means a commission of £400, not a huge fee if the job is done well and saves the client a lot of time doing it themselves. However, if the same commission is applied to a site using 1,000,000 kWh, it is now £4,000 even though the basic work of tendering is pretty much the same. When you consider that these consumptions may double if electricity and gas are both used and some brokers may add 1p/kwh or more, commissions can very quickly become very large and difficult to defend in terms of service provided.

While having all costs on utility bills can very often be easier than paying a direct fee to a broker, the fact that there is commission added should always be made clear to customers and the rate should also be disclosed if not agreed. There are a number of voluntary codes of conduct for brokers and this is always one of their key points. If you ask a broker how much their charges are and they don't want to tell you, refuse to answer or talk about how they add value, probably best to look for another one. Consider how much you think the broker's services are worth to you in time saved or hassle removed and try to agree a commission that reflects this. You may also want to ask the broker to put the commission rate in writing as proof of your agreement.

The area of commissions is one where there are regular examples of brokers acting in an underhand manner, especially with SME's or other bodies who tend to have less knowledge of energy markets. A little while ago, I was approached by a small charity who had received a renewal quote for gas from their broker. It was at 5.46p/kWh for a 5-year contract, a very high price, worse than most non-contract rates. The charity did not know if it was a good or bad offer but were being pressured by their broker to sign, with e-mails stressing how important it was to sign quickly. I obtained some equivalent quotes and the same 5-year contract with the same supplier came in at 3.6 p/kWh and an even better quote from another supplier at 3.4 was accepted by the charity. This shows the broker was trying to charge over 60% commission. Having seen their e-mails, I can confirm the broker was blatantly lying to the client, taking advantage of the fact they had little knowledge. Although their consumption levels and overall costs were not huge, this still meant a saving for the charity of over £1,000 per year, which to them and the work they do was a big deal.

Another example was a company who had used the same broker for many years and asked me to confirm they were being made a good offer, just as a cross check. I obtained a quote which was £10,000 cheaper than their normal broker in a contract that only had a total value of £60,000, again indicating a very large commission for what was a simple, single building tender.

It would be nice to say that these examples were just perhaps single individual brokers who were a couple of bad apples but unfortunately, both were large, big name brokers and not the only examples I could give. This fact is also borne out by the recent EMA study where many of the complaints featured well known brokers with one in particular the source of a number of complaints.

Independence

Another question to ask brokers is how independent they are. A good broker will have relationships with many suppliers and be able to give you a range of quotes to select from as the cheapest one may not always be from a supplier that you want to deal with due to previous customer service or billing issues for example. However, some brokers only have relationships with a small number of suppliers or perhaps, only even one or they may have far more beneficial commission arrangements with some suppliers than others. This may result in them either having or wanting to place customers with those suppliers although they may not be offering the best market rates.

One way brokers approach this is they may tell you they have received many quotes but only send the "top 3" to choose from. How do you know how many quotes they actually gathered, what the other quotes looked like and how do you know they were not better? You may not want to review huge lists of quotes but if a broker only works with a limited number of suppliers or wants to choose a specific one, this is a good way of hiding it.

Again, ask the awkward questions before using a broker, such as who they have relationships with and do they have preferential rates with any which means they may push them above others. Always ask for the information on all quotes received just to make sure they are doing their job, even if you still only take the cheapest one.

Market knowledge

A third question to sort out the poor brokers is to request some basic market information from them to show why it may be a good time to place a contract, rather than it just being the end of your current one. Even if you don't know what to look for yourself, a good broker will be happy to enter a discussion with you, will know exactly what wholesale markets are doing, what is driving them, will probably provide some basic market curves showing wholesale pricing patterns and provide information on the options for various length contracts.

The poor ones may not know how to answer this question and a regular response is just to tell you prices are going up so you need to sign quickly and also to potentially try to lock you in to a long duration, up to 5 years. This is a good sign that they cannot provide this information and just want a signed contract. A good broker will also be able to provide you with this market information during your contract, allowing you to see what markets are doing and when may be a good time to contract next time around.

Are you already stuck in a poor contract?

I am regularly asked if there is any way to get out of a contract once its signed if you realise it's poor or perhaps has been mis sold by a broker. Unfortunately, the contract you have signed will be with a licensed supplier rather than the broker and usually they cannot be cancelled.

If the broker has acted in an extremely dishonest or illegal way or breached a supplier's code of conduct and it can be proved, then it is worth speaking to the supplier, explaining the issue and asking for the contract to be cancelled. If the broker has broken the supplier's rules, they may review the sale and see if it was properly conducted.

However, and most likely, if they consider that the contract has been sold correctly or there is no evidence to the contrary, they are unlikely to cancel the contract however expensive or poor it is, so it is a case of buyer beware. One way of trying to avoid this in the first place is to record your call to the broker when you agree the contract or make them put everything in writing, so you have the evidence of what you have been told.

You may also want to tell them you are recording the conversation, as it may change their behaviour. After all, calls to suppliers are always recorded for the same reason, so they can prove they have not mis-sold contracts.

Historically, there has been support for domestic and micro business customers with regard to complaints about suppliers but businesses have not been well served to date with very little that can be done with regard to complaints about brokers. Ofgem have recently asked for additional powers to try to address the type of issues discussed in this article so hopefully action will be taken.

The EMA has for some time been collating evidence of poor broker behaviour so any examples you have of them acting in a dishonest, misleading or illegal manner would be of interest.

Just asking the type of questions mentioned here may well put off some brokers as they will see you know some of the industry tricks but many are experienced and well trained sales people, so may have a convincing sounding answer.

Finally remember the old rule, if a broker's offer sounds too good to be true, it probably is, especially if they are pressuring you to sign. Your site information is very valuable so don't be afraid to ask them some awkward questions before you let them have it. Perhaps talk to a few brokers to get a range of opinions and get some recommendations from other businesses who have already been through the process before you choose.

While this may take some time initially, finding yourself a good broker can lead to less time and money wasted in the long term, especially if you find yourself in a very expensive 5 year contract you cannot get out of.

> "A GOOD BROKER WILL ALSO BE ABLE TO PROVIDE YOU WITH THIS MARKET INFORMATION DURING YOUR CONTRACT, ALLOWING YOU TO SEE WHAT MARKETS ARE DOING AND WHEN MAY BE A GOOD TIME TO CONTRACT NEXT TIME AROUND."

Author's profile:

Mark Taylor has spent 20 years working within energy management, running his own consultancy for the last 8. He works in the public and private sector, offering procurement advice and sustainably reducing energy consumption and identifying and delivering renewable generation opportunities. Mark teaches energy procurement for the EMA.

by MARIA SPYROU
Energy Efficiency Manager at Balfour Beatty Kilpatrick

How to Develop and Successfully Present Business Cases

Energy Managers often identify opportunities for energy reduction, either through their own energy audits or audits carried out by third parties, such as the ones required for the Energy Savings Opportunity Scheme (ESOS). Opportunities identified could be anything from lighting replacement, controls upgrade, HVAC upgrade, the installation of renewables with a battery storage solution or even the upgrade of the site electrical connection to export generation onto the grid.

However, the work of the energy manager does not stop once an opportunity is identified. The second, and often more important step, is to create a business case that explains to the management team the reasons that the project is beneficial so they can make the necessary funds available.

A business case provides companies with the opportunity to assess certain criteria for each project. These include:

- Business opportunity or problem;
- Technical solution(s) possible;
- Benefits;
- Risks;
- Timescales;
- Impact on operations;
- Organisational capability to deliver the project outcomes;
- Costs, including investment appraisal;
- Measure of success criteria.

But what makes a successful business case?

This varies on a case-by-case basis and no two projects are the same, but certain rules of thumb hold true across the board. Below, you can find my top tips for developing and successfully presenting business cases.

Where to begin – identify & group opportunities

When identifying opportunities for energy reduction, it is best to use a targeted approach; focusing resources at one building at a time, or one technology at a time, depending on the type of estate you have at hand. Opportunities can be grouped based on the type of project, such as assessment of all lighting opportunities; or the building as a whole, i.e. all opportunities related to the building being assessed. A decision on the grouping should be based on what makes more sense for the specific projects and estate in question.

Another way of looking at it is focusing on the 'pain' areas for your buildings. For example, if you are managing several office blocks and one of them has a heating issue, look at upgrading the HVAC system. How old is your system? Has it been regularly maintained and cleaned? Is it correctly sized? Can the technology be improved? What about the controls? Moving on to other storeys or buildings within the estate, ask yourself the same questions.

Innovation – testing and trial verification

Testing and trialling of new technologies is a vitally important part of innovation. Innovative technologies are presented to us all the time, so you need to be able to assess their effectiveness in relation to your estate. The ways in which new technologies are trialled and verified could form a whole new article, but we can summarise the essential considerations for a new technology trial:

- What are you testing? What is the technology?
- Why are you testing it? What are you expecting to see or change?
- How are you testing it? What data are you going to monitor, and what method are you going to use to calculate benefits? Is the metering already in place and correctly calibrated? Have you allowed enough time to collect enough data to make your results statistically significant?

Once a trial is completed, savings and costs can then be extrapolated for a larger installation.

Calculate savings per initiative/group

Once an initiative has been identified, the consumption of the existing system should be estimated or calculated. Depending on what is available, you can use metered data, or you can estimate the consumption based on the rating of the unit and the number of hours it has been running in a year.

The International Performance Measurement and Verification Protocol (IPMVP) provides a method for measuring the savings depending on the type of project.

See Table 1 for an example calculation.

Existing scenario	Upgrade scenario	
30 fittings that have 3 x 28W lamps in each. Operating from 8am until 8pm every day apart from Sunday	30 LED fittings, 30W each. PIR control especially for meeting rooms that are not used, and Saturdays when staff is not regularly in. Estimated 20% reduction in operational hours	
Consumption before	**Consumption after**	**Savings**
30 fittings x 3 lamps x 28W = 2,520 W 12 hours x 6 days x 52 weeks = 3,744 hours → estimated consumption = 2,520 x 3,744/1000 = 9,434.88 kWh → 9,434.88 x £0.12 = £1,132	30 fittings x 30 W = 900 W 3,744 hours x 80% = 2,995.2 hours → estimated consumption = 900 x 2,995.2/1000 = 2,695.68 kWh → 2,695.68 x £0.12 = £323	(9,434-2,695)/9,434 = 71% reduction → 1,132 – 323 = £809 That's £809 saved every year off the electricity bill – if your cost is 12 pence per kWh

Table 1: Calculating consumption before and after an upgrade

> "WHEN IDENTIFYING OPPORTUNITIES FOR ENERGY REDUCTION, IT IS BEST TO USE A TARGETED APPROACH; FOCUSING RESOURCES AT ONE BUILDING AT A TIME, OR ONE TECHNOLOGY AT A TIME, DEPENDING ON THE TYPE OF ESTATE YOU HAVE AT HAND."

Calculate costs per initiative/group

Once you have calculated what your potential savings are, it is time to calculate the potential costs for the project. This could be simple, if the project is a one-for-one lighting replacement, or it could be complicated if a complete redesign of an HVAC system is required.

It is advisable that you speak to your supply chain to understand how much the upgrade would cost. A trusted partner might be able to offer products that are more efficient than your anticipated costs, or a cheaper and easier way to complete the project.

Depending on internal processes, this is probably the stage where a procurement manager should be engaged to ensure you are attaining value for money.

Are there any government schemes that could reduce costs or add revenue?

The Enhanced Capital Allowance scheme is a government-backed scheme that incentivises businesses to invest in more efficient technology:

"If you're a business that pays income or corporation tax, you'll be able to claim 100% first year capital allowance on a product if it's on the ETL (Energy Technology List) at the time of purchase."

Feed-in-Tariffs are also a government-backed scheme that could be used to make projects profitable, or financially viable.

Flexibility projects

Demand Side Response is a term you might be familiar with - the power responsive website by National Grid has a wealth of information and case studies of their customers.

If you are able to use electricity flexibly in your estate, for example reducing the demand on a manufacturing plant when electricity is more expensive, then you might be able to monetise this. Flexible assets can earn anything between £5,000 and £120,000 per MWh/year by converting them to respond to specific signals. Response times vary between the different models, with the slower assets earning less.

Investment appraisal tools: Payback, Return on Investment, and Net Present Value

All of the above are numbers your finance team will either ask for, or need to calculate when evaluating your business case. Table 2 below summarises these investment appraisal tools.

Payback	Return on Investment (ROI)	Net Present Value (NPV) (https://www.investopedia.com/terms/n/npv.asp)
= Total cost/ Total savings = £2500/£809 per year = 3.1 years	= Total savings/ Total cost = £809/£2500 = 0.32 or 32%	Check with your finance team, organisations have different values for discount rates

Table 2: Investment appraisal tools

When calculating your total costs to deliver a project, remember to consider write-off costs of the existing assets, if those have not been fully depreciated. Additionally, consider any other internal overhead costs you might incur, such as the cost of an additional project manager, or the cost of leaving lighting on for longer whilst a project is underway.

Prioritise opportunities

The investment appraisal tools above provide a good method for prioritising investment opportunities. A lower payback period and a higher ROI indicate better investments; similarly you are looking for a positive Net Present Value.

Depending on the hurdle rate of your organisation, this is the part of the process where you need to shift and re-evaluate some of the projects. For example, do you really need to completely redesign the HVAC plant, or could you use more efficient fans and more intelligent controls?

At the other end of the spectrum, if the payback is looking like it is far beyond expectations, then this is the time to consider additional measures that were in your 'nice to have' list that did not have as good a payback. For example, you could add some extra light fittings for a dark area that is causing issues.

Preparation is key for the presentation

You have identified opportunities, calculated their potential savings, the potential costs, and even attempted to appraise the investment with a finance manager's hat on. When it is time to present these projects to a leadership team or board of directors, you need to be thinking about convincing arguments for each one of them. Here are a few pointers on how to approach this:

- Prepare a well-rounded summary of the opportunity/ issue;
- Show how this will be solved with clear measures to realise the benefits;
- Pre-empt the questions that may be posed;
- Keep it simple, do not attempt to lump all of the initiatives together;
- Present a section of the opportunity but make it clear there is more;
- Give yourself realistic timescales; think about mobilisation and manufacturing lead times;
- Make sure your numbers are accurate;
- Include benefits that might be difficult to quantify; extended warranty and reduced maintenance costs, employee wellbeing and/or productivity, customer satisfaction, sales uplift, increased visibility. These additional benefits might not be easy to quantify, but they can make or break your business case;
- Work with suppliers you can trust;
- Show how you validated your proposition with accurate testing, trials and verification;
- Close with a statement: "I am seeking approval to proceed with the proposed investment…"

Finally, one final tip for preparing any business case:

Under-promise and over-deliver

I have found this to be very important, especially if you are pitching to a new CFO or finance director. Be realistic with your numbers and delivery timelines, and if you are uncertain about any, go with a worst-case scenario. That way, when the first project is completed on time and over delivering on savings, the managing team will have more faith in your numbers and projects.

Author's profile:

Dr Maria Spyrou helps customers develop and deliver their sustainability initiatives. Maria was the Energy Efficiency Manager for M&S for 3 years, developing and delivering more than £20M worth of energy efficiency initiatives. She earned an Engineering Doctorate in the energy efficiency of buildings from Loughborough University whilst working for Tesco.

by THE ENERGY MANAGERS ASSOCIATION

EMA Recognised Energy Manager

The Energy Managers Association is pleased to announce that Dewi Day, the Energy and Sustainability Advisor at Aberystwyth University, has joined the ranks of the EMA Recognised Energy Managers after successfully demonstrating the knowledge and skills in energy management through the Knowledge and Skills Gap Analysis Interview.

The EMA runs the Knowledge and Skills Gap Analysis Interview to help energy management professionals to not only pinpoint areas that may need expanding but also to show that often energy managers know far more than they think they know.

The Interview is a professional discussion with other energy management professionals touching upon your current areas of professional knowledge, whilst at the same time identifying any potential gaps, and suggesting ways to fill those gaps either through learning or mentoring. If interviewees demonstrate all the necessary knowledge in the core energy management competencies during the interview they will be awarded the official EMA endorsement of the Recognised Energy Manager.

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 and the interview process, please contact jana.skodlova@theema.org.uk or call 0203 176 2834.

by DEWI DAY
Energy and Sustainability Advisor at Aberystwyth University

An Interview with the EMA Recognised Energy Manager

How did you become interested in energy management?

My BSc and MSc were both in environmental management but after working in the industry for a few years as an environmental consultant in soil and water quality, I realised that the area of sustainability that interested me most was carbon management and this was heavily linked to the design and operation of our buildings. This wasn't something I knew much about so whilst working full-time, I did a distance learning PGCert in Energy and Sustainable Building Design which I really enjoyed. About 3 years later an opportunity came to move into energy management as an assistant energy manager at QinetiQ. That was 3 years ago now, and since then I had 3 months as acting Head of Energy at QinetiQ before moving on to Aberystwyth University as their Energy and Sustainability Advisor.

What does your role at Aberystwyth University entail?

In my current role as Energy and Sustainability Advisor, I am both the energy manager and environment manager combined. Therefore the role is very broad and varied - my responsibilities include managing the utilities across our estate (approx. 3.5 million budget), developing a new sustainability strategy, identifying and managing improvement projects, the implementation of management systems such as ISO 14001 and 50001, managing compliance, setting budgets, tenant billing, energy analysis, producing Display Energy Certificates, annual reporting, setting and monitoring objectives and KPI's; delivering training, etc.

What is the most exciting part of your job?

The main thing that attracted me to this job was that the university was looking to develop an entirely new sustainability and carbon strategy, and that I would be responsible for both identifying the strategic direction and detailing how it would be delivered. I am quickly realising that this is more challenging than I thought but I am still very excited by the project. Whilst daunting, the other aspect I relish about my current role is the ability to take a project all the way from conception through to completion. It has been a steep learning curve and I have learnt a lot in the past year, especially in terms of project management and public sector procurement.

What is the most frustrating part of your job?

I wouldn't call it frustrating, but one of the most difficult parts of my job, just as with many organisations, is that funding limitations mean that energy projects can sometimes focus on the low cost - quick wins. These smaller projects take a lot of time and it can sometimes feel as if there isn't enough time to make progress with the bigger, more significant improvement projects. We have however recently made some progress with larger projects, and are currently exploring energy performance contracts and renewable feasibility studies.

Can you describe your typical day?

As my role is so broad, I don't really have any typical days. The variety of tasks can be extremely different. One day I can be dealing with reducing single-use plastics in our catering outlets, the next I am advising on f-gas compliance, and the next I am looking at a business case for an energy efficiency project.

What drives you?

I feel fortunate to work in a sector that I am genuinely passionate about. Sustainability is something that I am equally conscious of at home as I am in work. I want to feel that I am helping to minimise our impact on the environment. It saddens me that we live in a world where progress on sustainability issues can be very slow and that future generations may be burdened with the impacts of our activities and lifestyles.

What qualities should a good energy manager possess?

In the relatively short time that I have been in the industry, I have realised that there are many kinds of energy managers out there so the importance of your skill sets depends on what kind of energy manager you want to be. Some energy managers focus on energy procurement and bill validation, some focus on energy efficiency project delivery, some on sustainability strategy. Being able to understand and interrogate energy and emissions data is an essential skill. Being able to develop good robust business cases for energy projects will also get you a long way. It's also worth noting that I have come across many business cases with overcooked paybacks and whilst this may help get a project approved it will likely lead to lack of trust in future business cases.

Which energy efficient innovation can revolutionise the global economy?

I am not sure if you class battery storage as an energy efficient innovation but I think that it could have huge impacts on the industry if the costs can be brought down. It could play a vital role in issues such as variability of renewable energy generation and energy demand management.

What prompted you to undertake the Knowledge and Skills' Gap Analysis Interview with the EMA?

I actually didn't think I was ready and was planning to wait another year. I was about halfway through a two-year plan working my way through the core competencies via a variety of training courses and workplace learning. I had already completed many of the training courses and had been heavily involved in almost all aspects of energy management at QinetiQ, and my manager at the time had a lot of belief in me and convinced me that I was ready to go for it.

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

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

What does next year hold for you?

The next year is shaping up to be a big year for sustainability at the university. We are investigating investment in a number of relatively large scale energy projects under the RE:FIT framework.

We are also developing a new carbon and sustainability strategy for the university so I am expecting a very busy year, but hopefully one that I will learn a lot from.

by THE ENERGY MANAGERS ASSOCIATION

EMA Employment and Pay Gap Survey Results – follow up

The recent EMA Employment and Pay Gap Survey results showed no direct links between respondents' salary, their qualification and the number of years they have been working in the industry. We have asked a number of the survey respondents to comment on this.

Q: In your experience, is this indeed the case, and what has helped you to further your career and/or achieve a pay rise in the past?

Leigh Hitchens, Director at Coral Energy

In my view, I believe there is no direct link. I have been in the industry for 30 years and in the early days it was very much about who you knew as opposed to your ability when it came to pay rises. There were little in terms of qualifications required in the early 90's. There were pay structures/ bands in place in large corporate companies but in reality it was still about how you were perceived in the business and who you knew that made a significant difference. The industry has moved forward and there are better structures in place but it took a long time. In the past having worked at three of the big 6 energy suppliers, the way forward was always about the sales you brought in but not necessarily in an ethical way; this has been borne out by OFGEM fines and periodically reported bad practices. I do not subscribe to this but it happened. I always placed very high standards in my work, high integrity, which eventually got noticed. This was often the case when customers fed back their experiences.

In terms of energy management now, I still do not think that qualifications can count for much. I am an accredited ESOS LA, DEA and NDEA and actually very few ask about my achievements and qualifications, rather it is about "can I get this done in this timescale" that counts. Energy is still not perceived as important enough in many organisations but I do believe that legislation is starting to make a difference but again it has taken a very long time.

I now run my own business and I still apply the same approach – honesty and integrity will eventually win out with customers. I only employ people who have the same ethical stance.

Dan Fernbank, Energy & Sustainability Manager at University of Reading

The links between salary, qualifications and length of experience are not always straight forward, and salary itself is not the only way to give or receive recognition, though it's an important one!

As a manager in the public sector, it can sometimes be frustrating not to be able to offer performance-related pay. However, it's important to consider your overall benefits package not just your pay packet alone, and feeling you are fairly paid can be as important as feeling you are well paid.

Personally, I think you need to own and take responsibility for your own career development, seeking opportunities to further your experience and knowledge, such as by taking on new projects and attending relevant seminars and events.

Energy management is a fast-changing sector with some really exciting opportunities to explore, and grasping those opportunities gives good job satisfaction and hopefully ultimately appropriate financial reward too. For me, that has twice meant me taking a pay cut to move to what I have considered to be a good role for my longer term development, and over time, I believe that has paid off.

Danny Clark, Technical Energy & Sustainability Manager at JLL

How does a company assess the worth of an energy manager? That is clearly a dilemma for many companies emphasised in the publication of the EMA Energy Manager Salary review.

In the past, the role of Energy Manager often evolved from another role within a company, either through technical expertise or expressing an interest. There was no job description developed and salaries were largely based on incremental increases over the previous position.

Competitive energy markets, infrastructure connections, security of supply, compulsory reporting, embedded renewables etc. on top of demand management have made the "worth test" even harder for companies.

Some still see it as a reporting and compliance role, rather than a highly skilled specialist role where experience really does count. Salary benchmarks may be set against clerical and invoice processing roles simply because they have not sought advice when writing the vacancy description.

Weak job descriptions attract a very different calibre of person whose salary expectations may be lower, and so the employer does not experience the full potential that an experienced, specialised and dedicated professional will bring.

It is difficult. The role of Energy Managers has evolved as much as any profession in the last twenty years. Some forward thinking companies have benefitted from proactive Energy Managers pushing boundaries, technology and opportunities – achieving excellent results with the support of the Board. They are the companies that will recognise and reward accordingly.

My biggest successes in energy management and indeed eventual recognition have come from taking initiatives to the board, bypassing convention and thinking outside the box. Indeed, it was this approach that persuaded Prudential to engage on its property management portfolio as a pioneer in the 1990s. But the company had to be receptive.

But some companies have employed purely for compliance and gone for lowest salary. The young emerging talent often fill these roles but without the commitment of the Board, they are likely to become dissatisfied and move on. The company has not progressed, nor seen any benefit and so they re-advertise the same role at the same salary.

Two streams of employers have emerged – the engaged and the compliers. That is the challenge for Energy Managers in achieving a remuneration package that is relative to success, contribution and recognition.

If you want to be rewarded appropriately either work for a company with a receptive culture, or persuade the complier to become the engaged. To do that you need to get access at Board level, and not be put off by those who can't see the opportunity or benefit.

The contribution is then recognised at the highest level, reward increases and Energy Managers help companies to realise value. They in turn benchmark the remuneration in an appropriate category according to qualification and experience. Sounds easy but some of us have been trying for years with varying degrees of success!

In the survey, we have also asked respondents what could be done to raise the status of energy managers and energy management at present. The responses that we have received suggest three main areas which could contribute to bringing energy managers and energy management into the limelight.

- ***Q1: More buy-in from senior management***
- ***Q2: Promoting the work that energy managers are undertaking***
- ***Q3: Political/regulatory/organisational structure***

See also next page.

> "Integrating energy management into the wider contract and making it a responsibility of all employees, rather than treating energy management as a separate goal.

> "Better education of senior managers of the roles and responsibilities of energy managers.

> "Energy managers to be seen as an integral part to BAU and future business resilience and not a back of house service, especially in the public sector. More personal stories from energy managers to encourage people to take it up as a career/or switch career.

More focus from central government, a reduction target for local government/ public sector, not just voluntary.

The last missed opportunity was giving some teeth to ESOS.

More legislation forcing companies to take energy and carbon reductions seriously.

Extend ESOS to public sector. Use legislation to force more change.

Giving budget accountability and ownership of delivery.

Energy managers can significantly reduce organisations' energy bills given sufficient support for recommissioning of buildings, but the support for this at senior level just isn't there because it's a revenue issue as opposed to capital investment.

In public sector you can meet all your targets in energy reduction, but it has little impact on how the public view the council as it has a low priority. Bins and benefits make the headlines. Unless the government makes it a greater priority, the local authorities will not view energy as a high priority.

Energy is still seen as a necessary overhead, consequently the role of energy managers remains undervalued. Raising the profile of the impact the cost of energy has on an organisations bottom line at board level is potentially the only way to bring it into direct vision of executives.

An increased presence of the importance of energy management, rising energy costs and potential energy security issues in the future at board level. Leading by example is key to better engagement with strong policies to support work.

Raising the profile of projects and the savings that are being delivered, often by a handful of staff.

Demonstrating the value they bring to an organisation, e.g. cost savings/income generation.

Recognition for all the other elements they have influence over, not just saving money on utility bills.

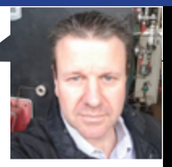
Boards including finance need to understand that this is not just about cost and carbon but future proofing, i.e. resilience and security of supply. Also, whole life costs and impact – utilities can no longer be seen as mutually exclusive from product or service but key enabler or blocker.

I think that raising the profile of the profession as a whole and treating energy management as a role in itself as a key skill set that can significantly contribute to the financial performance of an organisation.

Promotion of the role with a greater link to finance would help to lift roles status, as the role focus tends to balance between energy savings supporting cost savings/ procurement targets and environmental/carbon reductions targets.

Align them more with the SHE functions within an organisation where energy managers could get a better exposure. If kept within the Property & Facilities function they are 'forgotten' and just thought of as a provider.

by PAUL MIDDLETON
Technical Services Manager at Howbery Park Estates



To Decentralise or Not to Decentralise?

Howbery Business Park is the UK's first solar-powered business park and prides itself on creating a sustainable, contemporary working environment for its tenants. Set in 70 acres of landscaped grounds in South Oxfordshire near Wallingford, the park is home to over 50 companies and organisations, as well as amenities such as a gym, restaurant, conference facilities, all weather sports pitch and children's day nursery. The Park was awarded Business Park of the Year in 2017 at the Thames Valley Property Awards.

An average of more than 25% per year of the park's electricity usage is generated by the adjacent 748kWp solar farm, generating 682 Mwh/year with a CO2 saving/year of 362 tonnes and in May this year almost 42% of the park's electricity was solar generated. In 2017, the total electricity used on the Park was 2.8M kWh with an annual energy spend of £370,000.

Faced with an increasingly unreliable and ageing central steam gas boiler and its associated plant which served the older part of its estate, Howbery Park investigated different centralised and de-centralised options. The ideal solution needed to improve the security of heating supply, at the same time as future-proof the heating systems, and significantly reduce the park's carbon footprint, while also fitting in with the park's future development plans to create 74,000 sq. ft. (6,875 sq. m) of new office space. A number of different alternatives for the existing centralised steam boiler replacement were carefully considered. These included a conventional gas condensing boiler or with a sustainable option covering biomass heating, ground/air source heat pumps and combined heat and power (CHP) technologies. After consideration, 11 high efficiency condensing boilers were chosen and installed, along with one 40 kW overhead gas heater used as frost protection for a store area.

All viable options were considered to identify the ideal solution for the park:

- Do nothing
- New Central Steam Plant
- Centralised combined heat and power (CHP)
- Central gas Low Temperature Hot Water (LTHW)
- Central Biomass boilers
- Decentralised gas boilers (preferred option)

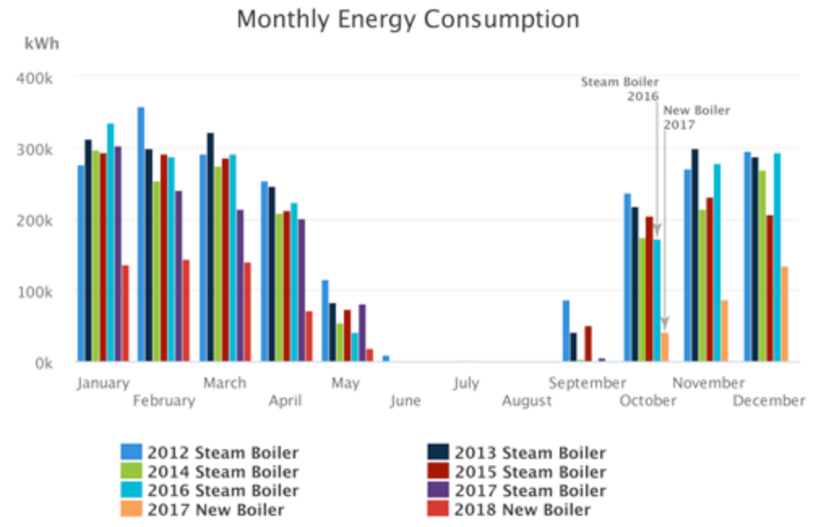
The project commenced in June 2017 with the aim that the new system would be able to supply better heating security without the reliance on a single source heat supply or any single point failure of components associated with the old heating supply. After considering all of our options in alternative technologies, it was found that the most economical option, whilst still achieving significant carbon emission reductions, was to install local, efficient gas condensing boilers. In fact, the National Grid's winter 2017/18 review issued on 11 June 2018 stated that demand for gas across the UK was actually higher than they had forecasted in their Winter Outlook report issued in October 2017.

Due to the complexity of the existing steam heating system and underground network, which runs underneath roadways, as well as landscaped areas, the project time frame had to be completed with minimal disruption to the day-to-day running of the park's activities, so it was carried out over the heating season shutdown period, which is between mid-May and mid-September. It was also necessary to secure planning permission for installation of the new boilers and flue system to our Manor House, which is a Grade II listed building – this planning permission being the hinge point of securing a successful project! There was also a plan B of adding in a temporary package boiler plant to the Manor House, if permission were delayed. With this, a new gas main was also installed as part of the project.

With the increasingly unreliable operation and historic breakdowns of the existing boiler plant, it was possible that further breakdowns could lead to potential loss of heating during the winter months, and in some cases could allow long periods without heating along with increasing inefficiencies of the system and its subsequent increase in fuel costs. Initial costs of this project had an own company investment with a return of approximately 5.5 years and therefore gained Board approval.

The existing steam heating system varied in age as the system had been replaced/modified since 2001 on an existing system that originated in the 1980s. Efficiency of the system had also declined with age, and this could be clearly seen from the underground steam supply pipework layout during the winter months, as any frost or snow did not accumulate over the areas where the pipework was located even though insulation was applied. There were also significant health and safety risks with working on such high temperature and high pressure steam systems in addition to the statutory inspections required. Over the years, there have been several occasions where simple faults have caused the central steam boiler to fail (e.g. power blips) which can cause the loss of total heating to all buildings if not acted upon quickly. There was also the increase in fuel costs and maintenance costs associated with such plant to consider.

Analysis of conventional against sustainable installation design, taking into account the age of the building fabric and insulating properties, indicated that installing condensing gas boilers was more economical and fell within agreed budgets, while still providing an approximate 50% calculated carbon reduction compared to the existing system. In the 2016/17 heating season our total emissions produced from the steam boiler were 325,914kg CO2e. Under this option, each of the 7 individual buildings would be provided with its own dedicated condensing boiler arrangement along with a plate heat exchanger arrangement. These boilers are highly efficient; the boilers can be provided with full control packages and in some smaller models, integrated circulation pumps. The proposal in the larger buildings was to provide a cascade type system to maximise flexibility, and on smaller installations a packaged boiler system, all with weather compensated controllers. The average yearly operating hours of the existing steam boiler were 5,808 hours a year compared to the new boilers which are estimated to operate around 2,600 hours a year which will also bring a reduction in electricity use.



Further benefits of decentralisation include reduced water usage and water treatment costs. This forms a critical part of achieving a reliable steam system, as any deterioration in water quality can cause the steam boiler to not operate efficiently or even fail to operate.

The new boilers have been installed within the existing plant rooms in each building, therefore using existing space after removing the old steam heating plant, complete with new flue systems. Along with this, there is a new gas distribution system to each building with new gas meters for each building as well.

Not only will there be reduction in water treatment, there will be a water consumption saving of around 420 m^3/year which is the equivalent of around 5,460 baths!

We even managed to locate and repair a mains water pipework leak during the installation of the gas mains which we were previously aware of from our water meter data loggers. These loggers allow us to monitor off peak usage and therefore track unusual water consumption.

There is also the reduction in daily maintenance activities associated with this type of steam boiler plant, and this activity time is now directed at other tasks around the business park.

> **“NOT ONLY WILL THERE BE REDUCTION IN WATER TREATMENT, THERE WILL BE A WATER CONSUMPTION SAVING OF AROUND 420 M^3/YEAR WHICH IS THE EQUIVALENT OF AROUND 5,460 BATHS!”**

Using the JCT 2016 Design and Build Contract and also monitoring of project progress, we achieved completion in early September 2017 ready for what was to be quite an interesting season in weather terms ahead of us, with the infamous Beast from the East being released upon us!

To ensure that energy efficiency is being achieved, continuous monitoring and recording of the gas consumption and carbon emissions was carried out in line with our current monitoring activities using weather compensated calculations to ensure reliability of data recorded. We also use Met Office historic weather data to make a month on month comparison in the outside air temperature against building heating requirements, also capturing Heating Degree Day data from our local Met weather station. In fact, we achieved better than expected results, with an overall average energy saving of 61% saving us 211,764 kgCO2 and 1,150,886 kWh of energy and with an energy cost saving alone over 7 months of £26,000.

Similar cost savings were made in the overall maintenance of the previous system. End user feedback was also captured over the winter months to ensure that the system delivered as expected, and this has proven to be successful.

With a new heating season now ahead of us, we can't wait to see what the season throws at us, safe in the knowledge of the reliable, safe and efficient system we now have on site. Our plan is to continue with our plant replacement programme to replace existing lighting with LED versions where practicable, and also with the replacement of 121 x 400 watt high bay lights to LED as well as replacing our high voltage transformers.

Author's profile:

Since leaving the MoD in 1992 as a fully qualified electrician, Paul, now Technical Services Manager, has gained over 30 years' experience in the industry. He has achieved numerous qualifications along the way, including gas and refrigeration areas, gaining membership of the Fire Protection Association along with IFSM membership, EngTech and CIBSE.

by Dr. VASSIA PALOUMBI
EMA Board Member and former Energy and Environmental Manager at the Bank of England

Energy Performance Contracts (EPCs) – How to make them a success and avoid common pitfalls

The Council of the European Union (2012) identifies EPCs as a potential solution to energy challenges. In simple terms, an EPC is a binding agreement between the customer/end-user and the ESCO (energy service company) to apply energy saving measures to their facility which will reduce energy usage, emissions and operational costs. This agreement is guaranteed at the risk of the ESCO, which means that the ESCO takes over the entire performance and design risk. EPCs are a form of 'creative financing' for improving buildings and getting the most of organisations upcoming capital projects by combining energy efficiency.

The ESCO designs, calculates and implements the energy savings measures and contractually guarantees the financial and energy savings (and sequentially CO2 savings). This is done through energy reduction measures and optimised assets such as the building plant (lighting, heating, ventilation and air-conditioning equipment). The ESCO justifies and monitors the said savings throughout the duration of the payback of the contract, therefore in effect the annual savings from implementing the EPC will reimburse the loan required to deliver the project works.

The use of EPCs has been growing in the UK mainly in the public sector organisations over the last few years. EPCs have been delivered across a range of buildings including NHS, schools, local authorities and other public buildings and its popularity is mainly due to the award winning programme RE:FIT. RE:FIT is part of the London Mayor's £34 million Energy for Londoners programme, and its aim is to make non-domestic public buildings and assets more energy efficient. I have been lucky enough to work with RE:FIT both while in Hammersmith and Fulham Council and Bank of England. I have worked with different contractors under the framework and used the framework to improve different types of buildings and assets. I have been able to experience first-hand the main issues, risks and opportunities and how to successfully drive and implement such contract and take advantage of the benefits of the framework.

A few months ago I was invited to take part in a research project on EPCs, with particular focus on the concerns and hesitations from an end user perspective in implementing the contract as I have successfully implemented EPC (specifically RE:FIT) and worked closely with different ESCOs. The research was carried out by Patrick Doyle as part of his Master's degree; MSc Project Management "Construction" at London South Bank University. Patrick and I worked closely during roll-out of the RE:FIT framework for the Bank of England. One of the interview questions was about the popularity of the EPC contracts and I found out that contracts like these have been around since the 1970's and 80's in the US as a result of the "energy crisis". This is often referred to as the first generation of energy performance contracting. I could not help but wonder why they have not been so popular in the UK, taking into account their offering as well as the Climate Change Act and the Government's commitment for emissions reduction. For me and energy managers alike, EPCs are a no-brainer, they offer cost and carbon savings –which are guaranteed, there is no risk involved, low interest financing (although not widely known) exists, and they provide a great opportunity to get capital, maintenance, finance team as well as energy managers working together and learning from some of the best energy service providers and engineers in the field. On the other hand, I have many times experienced first-hand the concerns and scepticism involved in such arrangements from the end-user side and it comes down to:

- The difficulty of understanding the commercial model probably due to lack of relevant communication and success stories out there;
- The lack of relevant legislation and regulation to commit an organisation to save energy and carbon. Although the new Minimum Energy Efficiency Standards (MEES) has made a small difference, others such as ESOS or CRC stopped short of enforcing changes and improvements for energy and carbon reductions.

From the ESCO point of view following the research, the main barriers to organisations successfully implementing EPC are:

- The inability to access low interest finance or completion with other capital works funds;
- The co-ordination between the capital/FM and energy teams so that vital lifecycle equipment can be scheduled to be replaced with the most energy efficient solutions;
- The lack of in-house technical assurance and skills available on the end-user side.

and by PATRICK DOYLE
Energy Business Development Manager at Bouygues Energies and Services (UK)

Patrick and I have tried to help by breaking down the process and addressing common issues which will arise in each stage and bringing in solutions and findings from the research project.

Key stages and how to overcome issues

Although there are a number of different EPC types of framework, RE:FIT for non-domestic public buildings, Essentia Trading Ltd, for NHS Trusts and other public buildings and Carbon Efficiency Fund, to name a few they would all follow the same stages:

- Initial Desktop Assessment/ High Level Agreement (DTA or HLA) – 20 working days;
- Tender – typically 2-6weeks depending on end-user;
- Investment Grade Proposal (IGP) – 60 to 90 working days depending on level of scope;
- Contract and Energy Conservation Measures (ECMs) – up to 60 working days depending on the contract complexity and the end-user's legal capabilities (in-house or contracted);
- Service delivery/monitoring stage – the delivery is typically flexible and specified by the end-user, particularly due to site requirements (night time, weekend works, etc.). Monitoring is constantly carried out by the ESCO for the duration of the payback and most commonly a report will be delivered annually until the required payback is achieved.

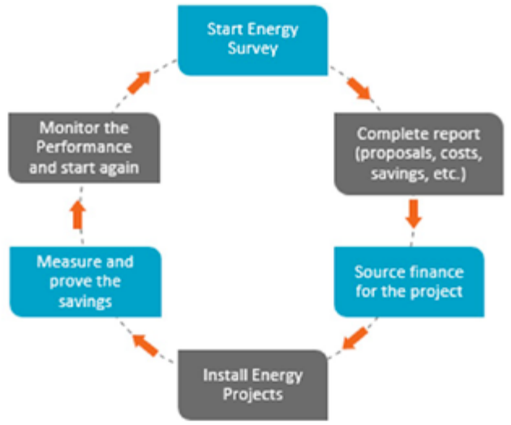
Below, we have tried to explain what each stage includes and the main recommendation of overcoming issues that may arise in each stage.

Initial Desktop Assessment/ High Level Agreement (DTA or HLA)

Although this is only a first and very short stage, it is key for the organisation as an end-user and the main stakeholders from within the organisation to understand how a project like this will be procured and financed. Even in this initial stage, it is quite important to start a conversation with the internal stakeholders in the organisation who will be signing off the project and start 'educating' the organisation about EPCs. In addition building managers and site engineers should be involved as their site specific knowledge will be helpful to the ESCO. It is also quite important to think and define requirements (e.g. cost saving, CO2 reduction, payback). These will be set at this stage and they need to be realistic and achievable as it is quite common that during the Investment Grade Proposal Stage (IGP) these will need to be met by the chosen contractor/ ESCO. At this stage, some of the information the EPC contractor(s) would usually look to attain will include energy data, plant/asset lists, relevant drawings and any planned lifecycle or capital projects (as they could be incorporated under the EPC). It is therefore quite important that they are accurate and up-to-date but you will have the opportunity to review these during the IGP stage.

Once this information is assessed, the site's energy baseline can be generated and the contractor can complete high level scoping surveys with knowledge of the site's most energy intensive equipment and areas. Under some of the frameworks and subject to receiving all of the required information from the end-user the HLA can be completed within 20 working days.

It is at this stage that the preferred funding route should be chosen, whether it is the capex, or a low interest third party funding.



Tender

If you have taken the RE:FIT route then the tender process becomes much easier and shorter, and therefore huge resourcing from end-user side is not necessary when compared to an OJEU based tender. The RE:FIT framework is already a competitively tendered and OJEU-advertised framework. In addition, the Programme Delivery Unit (PDU) is there to provide expert free support for the end-user during the whole process. Up to this stage the process is usually free and the main cost involved is staff time.

The end-user usually provides a maximum budget, desired payback and carbon targets and if they want any energy measures in particular to be included or disregarded prior to the offerings being submitted, the ESCO can come up with the best scope of works to achieve these criteria.

When looking at the different proposals from the interested contractors you need to remember that what the bidder is presenting is in most cases based on what was discussed or defined during the initial stage. There will be different options for energy conservation measures

and commonly low cost measures will have a quicker payback where more innovative solutions may have higher costs and longer paybacks but great carbon reduction potential. You need to be clear if you want the bidders to be innovative, consider renewable options and other new technologies or just upgrading of your existing assets.

One of the main difficulties here for the ESCO is the false perceptions of paybacks. It is believed that certain technologies such as lighting upgrades for example can achieve a payback within 2 or 3 years. This is rarely the case. When suppliers provide these high-level quotes, they are usually just taking into account the equipment cost, not labour, access and associated costs. Thus, often the end-user's expectations can be unrealistic and the ESCO have to justify this and manage expectations.

Investment Grade Proposal (IGP)

The IGP is prepared and produced by the ESCO and includes details of Energy Conservation Measures (ECMs) to be installed, the guaranteed savings, tonnes of CO_2 saved a year, capital costs, payback periods as well as the details of the Measuring and Verification (M&V) plan of how the guarantee savings will be realised. Energy audits, comprehensive analysis of energy data as well as energy tariffs are the key components of this stage. It is common that the scope may also change as this process so far may have highlighted upcoming capital projects. At this stage involvement of key stakeholders is crucial again. People on the ground looking after the buildings will need to provide a lot of information and in some cases the information is non-existent. When the ESCO team gets to site they can be met with varying attitudes depending on the position and individual site. Sometimes the O&M team can welcome the EPC works and understand that it will benefit their site, however other times the ESCO can be met with cynicism as the site based team can be somewhat protective of their site, how they run, operate and maintain the building, etc.

Whereas the in-house energy managers are typically positive with the EPC, as it will aid in achieving energy and carbon targets, especially if the organisation has committed to carbon reduction targets, it is common that collaboration and information sharing between ESCO and in-house teams can be difficult and not transparent. As part of the in-depth investigation and analysis, the ESCO may uncover and raise issues with the site M&E infrastructure that they should have already known about or may need information and documents that do not exist. The role of the in-house energy manager and the support of the main advocates in the organisation of the EPC are key to iron out any difficulties in this stage, especially if the maintenance contract is outsourced.

The IGP is usually charged at a small fee but if the EPC goes to the next stage of contract and implementation it can form a part of the total cost of the project. The IGP stage incurs a fee as it is usually at this stage that the decision is taken not to proceed to deliver the works. This may be due to a variety of reasons, such as uncertainty around the future use of the building or finance routes. By charging the fee, the ESCO is able to recover some of the cost invested in the project so far, but the fee often does not cover the time spend on the project up to that point.

Contract and Energy Conservation Measures

Once the first three phases are complete the next steps should be generally pain free, depending on the bureaucracy inside the organisation and how much engagement and communication has taken place up to this point.

The ESCO can be appointed under the implementation contract. A legal representative needs to be appointed early enough to give them time to understand the model and the scope. If the EPC is being delivered through a framework, for instance RE:FIT, there can be additional support provided to the end-user from the Programme Delivery Unit (PDU) which can help mitigate resource issues if applicable.

It is recommended to plan frequent meetings with all the right stakeholders from both end-user and ESCO during this stage. The meeting structure may depend on the delivery contract used (JCT or NEC) as project updates can be via bi-weekly or monthly project meetings and/or regular programme updates. The meetings and updates will also vary depending on the site, its challenges and sensitivities:

- Educational facilities: timescales and programme based out of hours and holiday period,
- NHS/Healthcare: night time works and maybe back of house focused projects,
- Commercial buildings: weekends and out of hour works, etc.

It is quite common that during this stage the end-user may decide to bring different consultants in to review technical information and calculations of the project. If this is the case, then roles and responsibilities between ESCO and consultants need to be clear and it is suggested that consultants may be involved to check legality and contractual arrangements and ensure all guarantees, savings and targets are adhered.

Keep in mind that as part of the EPC the ESCO has the responsibility to produce all of the designs and engineering at their risk and guarantees the savings. Bringing in third-party to review these may prolong the contract start date, installation and therefore the start of the benefits realisation.

Service deliver/ monitoring stage

As energy and carbon savings are key to these type contracts, these will be realised during the delivery stage once installation of all ECMs is complete. You may have the added complexity here of having an energy part and a lifecycle part as part of your EPC. This should be outlined in your IGP in a format that should be clear to everyone.

There is often scientism at the measurement and verification (M&V) and reporting stage. However, all M&V reports and calculations are carried out by an internationally recognised protocol known as the International Performance Measurement and Verification Protocol (IPMVP).

IPMVP lays out how calculations should be carried out and calculated, lists what has to be taken into account and even allows for adjustments with such factors as outdoor air temperature and changes in occupancy (both increase and decrease to ensure fair and unbiased reporting, savings and guarantees. Most ESCOs will have online M&V platforms to ensure clarity and ease of reporting.

These reports will be issued to the end-user annually or biannually, but the ESCO will be constantly monitoring the energy data for any fluctuations or irregularity regarding the energy use and will raise this with the end-user as and when it is an issue. Some of the savings will be realised really quickly and some will take longer. The Energy Manager should be a crucial part of this stage and in some cases (for example under RE:FIT), free training on IPMVP is offered for stakeholders on the end-user side.

Conclusion

From our hands-on experience and academic research into the topic, findings indicate that the uncertainty concerning the EPC model is predominantly as a result of many having a distorted and flawed understanding of the model.

Nevertheless, there are some cases where the site process, complications with tenancies and/or uncertainty of a building's future justifies the end-user's reluctance to consider implementing the EPC model.

For issues regarding capex there are many routes to low interest loans for renewable and efficiency projects; with scepticism concerning the guarantees there are contracts put in place to ensure that these savings, guarantees and paybacks are binding at the risk of the ESCO; there seems to be concerns regarding the M&V but as aforementioned it will be produced following an internationally standardised protocol.

To conclude it is widely known through the energy industry that EPCs meet many site challenges and are considered as low-risk high-reward agreements.

In the vast majority of cases the use of the EPC model for the associated direct and non-direct benefits is viable and the advantages greatly overshadow the drawbacks. It offers a great way to reduce organisations' environmental impact and cost and this can be done at minimum risk to you as an end-user.

Author's profiles:

Vassia has over 10 years' experience in energy management and delivering sustainability and environmental programmes for organisations with complicated estate portfolio across the private and public sector. As the in-house expert, she helped to reduce carbon emissions, deliver energy and financial savings as well as developed and implemented a number of large and complicated projects including capital, renewable installations and behaviour change.

Patrick studied Facilities and Energy Management in Ireland and have just completed a Master's Degree in Construction Project Management. With 5 years in industry, he worked in Ireland as a Domestic Energy Advisor before joining Bouygues Energies & Services graduate programme, and gaining a position in the Energy Engineering team.

by AMAAD AHMED
Director and Founder of Encope Ltd.

Climate Change Economic Incentives and Their Successes and Failures

At the time of writing, in 2018 the UK is experiencing the hottest and driest summer since records began. Perhaps this is another symptom of climate change. Regardless, there is clear evidence that climate change is occurring. The temperature at the Earth's surface has increased by 1°C since the pre-industrial average. It is believed that to minimise the most disruptive consequences of climate change the average temperature increase by the end of the century needs to be kept to under 2°C. As such, most national governments have agreed to limit warming to well below this 2°C threshold. In addition to mandatory legislation, the UK has implemented several voluntary economic incentives to help support the private and public sector in achieving a reduction in their greenhouse gas emissions.

There are a number of available incentives, these include:

- Feed in Tariffs
- Renewable Obligation Certificates
- Renewable Heat Incentive
- Climate Change Agreements for discounts on the Climate Change Levy
- Enhanced Capital Allowances
- Green financing
- Grants for plug-in low emission vehicles

A selection of the above-listed incentives will be examined further in this article to determine which ones can be deemed a success and which ones have failed to deliver on their objectives.

Successful Climate Change Economic Incentives

Feed in Tariffs

The Feed in Tariff (FiT) scheme is designed to encourage the uptake of small-scale (up to 5MW) low carbon and renewable energy generation technologies. Under the scheme, quarterly payments are made to scheme owners for the generation and export of electricity. The supported technologies include:

- Solar PV
- Anaerobic digestion
- Combined Heat and Power (CHP) (up to 2kW installations)
- Wind

The scheme was initially introduced in 2010 and applications for new generation schemes can still be made. However, there are monthly caps for the number of new installations deployed and the department of Business Energy and Industrial Strategy (BEIS) have issued a consultation, in which they state their intention to close the scheme to new applicants from April 2019 onwards.

With the Scheme being scheduled to end (at least in its current form) in 2019, reflecting back it can be viewed as one of the most successful policies of the UK government. A review of the scheme by The Department of Energy and Climate Change (DECC now BEIS) in 2015 determined that the scheme supported over 780,000 installations with a total of 4.2 GW of renewable electricity generating capacity across all supported technologies[i]. This (along with ROCs) has helped renewables gain a significant share of the UK's electricity generation mix. The renewables' share of electricity generation is now at 29.4%, second only to gas[ii].

Climate Change Agreements

Voluntary Climate Change Agreements (CCAs) are available for businesses operating in eligible industries. Operators are given energy and carbon reduction targets. Umbrella targets are agreed between BEIS and sector associations, which in turn issue underlying agreements to individual sites.

The ultimate target is 2020, but interim targets are set every two years. In return, operators receive a discount (currently 90% on electricity and 65% on other fuels) on the Climate Change Levy (CCL), a tax added to electricity and fuel bills.

The CCAs will be in place until 2023. If targets are not met for a 2-year target period, then a buy-out fee is payable in order to remain in the CCA.

As of December 2017, a total of around 8,300 sites across 53 industrial sectors have signed up to targets[iii]. Not only do CCAs ensure that businesses are voluntarily operating more efficiently and actively trying to reduce their carbon emissions, they offer significant cost reductions for energy-intensive industries in the UK. This is helping them to be more competitive with similar industries abroad.

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Following the ending of the CRC scheme in 2019 an increase in CCL rates will come in to effect to compensate for the loss of CRC revenue. However, an increase in CCL discounts for CCA holders also coincides with this levy increase. As such, this has led to a further increased demand for CCAs across businesses.

Failed Climate Change Economic Incentives

Renewable Heat Incentives

The Renewable Heat Incentive (RHI) was introduced in 2011 initially for non-domestic installations before being expanded for the domestic market also. The RHI provides financial incentives to aid the uptake of renewable heat from the following eligible technologies:

- Biomass
- Solar thermal
- Biogas
- CHP
- Air, ground and water source heat pumps

Unlike the FiTs, the RHI has not been deemed as a successful policy and is expected to be phased out over the next few years. In a recent report from the Parliamentary Accounts Committee (PAC), MPs slammed the scheme's design and performance for failing to effectively support homes and businesses in installing renewable technologies. Under the scheme over a period of 4 years, only 60,000 renewable appliances were installed, in comparison with 6.2 million gas boilers[iv]. Due to this, the contribution to the UK's carbon reduction obligations has taken a significant hit. As such, other schemes/ policies have to pick up the slack to ensure that the obligations are met.

The RHIs reputation has also suffered after the "Cash for Ash" scandal in Northern Ireland, where the failure to implement proper cost control led to installations being used to generate profit for their owners by constantly heating their properties. Subsequently, the Department of Enterprise, Trade and Investment suspended the Northern Ireland RHI Scheme to new applicants from 29 February 2016. Evidence of similar activities have also been personally witnessed by myself during energy efficiency audits across the UK where I've seen biomass boilers being run overnight to maximise the RHI payments and Return on Investment (ROI).

Green Deal

Launched in 2013 the Green Deal scheme offered homeowners loans to implement energy-saving improvements, mitigating the high upfront cost of undertaking energy efficient improvements. These included adding insulation, draught proofing and boiler replacements etc. The loans were expected to be repaid over time from the financial savings generated by these implementations.

In July 2015, the Government pulled the plug on the scheme, due to low uptake. The failure could be attributed to the high-interest rates on the loans (up to 10% APR), which was higher than that offered on commercial loans from the highstreets banks. Additionally, the loans were attached to the home rather than the individual applying for the loans, this led to the fear that homes with such agreements could become more difficult to sell. As a result, only about 15,000 Green Deal loans were issued over the two-and-a-half years the scheme was open[v].

The scheme has been relaunched again under private ownership, with the new owners intending to simplify the scheme to make the application process easier. With the new Minimum Energy Efficiency Standard (MEES) regulations for the private rented sector in effect, the relaunched scheme could offer property owners an alternative financing option to ensure that they are compliant with the regulations.

Conclusion

In relation to its targeted carbon reductions, The UK is currently in the third carbon budget period (2018 to 2022). It is on target to meet this phase of carbon budgets. This shows that the successful incentives (such as FiTs and CCAs) have up to now made up for the underperformance of the failed incentives highlighted above.

However, the UK is not on target to meet future carbon budgets. It is estimated that to reduce emissions by at least 80% of 1990 levels by 2050, will require reducing domestic emissions by at least 3% per year[vi]. It is evident that this will require existing progress from the successful incentives to be supplemented by more challenging policies and more enticing incentives.

Author's profile:

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[i]Department of Energy and Climate Change (2015). Review of the Feed-in Tariffs Scheme. London, p.5.
[ii]Department for Business, Energy and Industrial Strategy (2018). UK Energy Statistics, 2017 & Q4 2017. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/695626/Press_Notice_March_2018.pdf [Accessed 12 Aug. 2018].
[iii]Department for Business, Energy and Industrial Strategy (2017). Report on the post implementation review of the climate change agreements (eligible facilities) regulations 2012 (SI 2012/2999): Regulations 3-8. London, p.4.
[iv]Reporter, E. (2018). Renewable Heat Incentive 'failed to provide value', finds Commons committee - News for the Oil and Gas Sector. [online] Energy Voice. Available at: https://www.energyvoice.com/otherenergy/171569/renewable-heat-incentive-failed-to-provide-value-finds-commons-committee/ [Accessed 12 Aug. 2018].
[v]Vaughan, A. (2018). Government kills off flagship green deal for home insulation. [online] the Guardian. Available at: https://www.theguardian.com/environment/2015/jul/23/uk-ceases-financing-of-green-deal [Accessed 12 Aug. 2018].
[vi]Committee on Climate Change. (2018). How the UK is progressing - Committee on Climate Change. [online] Available at: https://www.theccc.org.uk/tackling-climate-change/reducing-carbon-emissions/how-the-uk-is-progressing/ [Accessed 12 Aug. 2018].

Megatrends to be covered at EMEX London, The UK's Must-Attend Energy Management Show

EMEX (www.emexlondon.com) and its community is returning to the ExCeL Centre in London on 21st and 22nd November with a packed programme spread across 4 free-to-attend CPD-accredited seminar theatres.

EMEX is the must-attend energy management show that connects all energy users with leading experts, policy makers, suppliers and technical solutions.

EMEX is a two-day event with over 130 exhibitors and 80 free-to-attend CPD-accredited seminars spread across 4 theatres:

- Knowledge, Skills and Experience
- Sustainability & Climate Change (**new**)
- Facilities, Technology & Innovation
- Renewable Energy, Supply and Storage

Content provided at EMEX is curated by the Energy Managers Association and its Board of major energy users and will include the opportunity for you to meet with top industry experts, peers and numerous leading suppliers that will unveil the latest technology and energy efficiency strategies available right now.

For the first time at EMEX, we are bringing together IEMA (Sustainability), BIFM (Facility), SOE (Operations) and the EMA (Energy Management) under one roof; four communities that have long been responsible for carbon and energy reduction in organisations.

New in 2018, The Sustainability & Climate Change Theatre, in partnership with IEMA, will host two days of informative and thought provoking seminars on key topics within the climate change and energy sector from industry experts. An added opportunity to learn about effective techniques and opportunities for change from leading professionals creating our low carbon sustainable future.

The exhibition and the seminar programme at EMEX will ensure that all practitioners of sound Energy Management will gain a greater understanding of their shared objectives, experiences and opportunities. In fact, together, they can ensure that all initiatives are complementary to all.

Are you aware of the latest technology and innovation?

With over 130 exhibitors ranging from major utilities to brokers and consultants, equipment manufacturers to training companies and showcasing a broad range of energy efficient solutions and services under one roof, EMEX has become a unique opportunity to learn about the new technology, systems and services available in this fast-changing environment.

Participants include AB, Armstrong, Birdsall, BRE, BSI, Carlo Gavazzi, Chauvin Arnoux Group, DANLERS Limited, Denchi Group, DNV GL, Eaton, ebm-papst UK, EcoCooling, ElectroRoute, Elgin Energy, ENERCON, ESB, FlexiSolar, Green Energy Consulting, Green Energy Solutions, Grundfos Pumps Ltd, Hamworthy Heating, Ignite Energy, Innotech Europe Ltd, Kelda Technology, Maximus Green, MME EDF PowerNow, NatWest, NFU Energy Service, Nicotra-Gebhardt Ltd, Norvento Enerxía, Optima Energy Management, Optimised Buildings, PE Energy Solutions Limited, Powerstar, Re:fit | Local Partnerships, SGS, SOE, SolX Energy Ltd, The Water Retail Company, VERDE LED, VINCI Facilities, Wilo and many more.

In addition to the technical expertise and data analysis, the role of the energy management team is evolving. Influencing and negotiation, communication and stakeholder engagement skills are becoming ever more important. EMEX seminars will cover a vast range of energy management strategies and experiences across various sectors, providing attendees with vital knowledge and new skills on how to build a robust business case for investment in energy efficiency and renewable energy projects, and gain buy-in from senior stakeholders.

Have you got the skills, knowledge and experience to promote your energy efficiency projects within your organisation?

Does your business require flexibility in energy supply?

The UK's energy mix is fast changing and demand reduction is a key area the government is very keen on. Demand Side Response (DSR) is a fast-growing market that enables National Grid to balance Britain's electricity system cost-effectively, while our energy landscape changes rapidly. If your business has the flexibility to increase, decrease, or shift its electricity use, then the power is in your hands to take full advantage.

Back by popular demand, EMEX will feature the **`Flexible Power Zone' in partnership with Power Responsive (National Grid).** This area is designed for the uninitiated to understand and evaluate this widely talked about opportunity. A dozen participating DSR and Battery Storage partners of National Grid will each give a presentation and be available to talk with you one on one.

It's your opportunity to find a supplier that talks your language and makes sense for your business and for Climate Change Agreements (CCAs) across businesses.

Participants confirmed so far in the Flexible Power Zone include **E.ON Energy Solutions, EDF Energy, GridBeyond, Ørsted, Power Responsive, Ecotricity, Energy Pool, Flexitricity, KiWi Power.**

Lord Redesdale, CEO at the EMA will explore how changes in the electricity codes are developing so trading energy demand reduction through the use of batteries can become a compelling investment for businesses with onsite renewables and balancing mechanism units.

Does your organisation keep on top of the coming taxes and regulations?

Gary Shanahan, Head of Business and Industrial Energy Efficiency, Tax and Reporting at the Department for Business, Energy and Industrial Strategy (BEIS), will provide an update on business and industrial energy efficiency, including the development of a streamlined energy and carbon reporting, preparations for the next phase of the Energy Savings Opportunity Scheme (ESOS) and progress on the CCAs and the CRC Energy Efficiency Schemes.

In partnership with ELGIN ENERGY

ASK FOR THE EMEX PPA GUIDE

The demand for corporate Power Purchase Agreements (PPAs) is growing and the UK market is changing rapidly. It can be difficult to keep up to date with the pace of development and identify what is right for your organisation.

This year, EMEX has introduced a PPA Partner to provide our delegates with insights and information on Corporate PPAs.

EMEX PPA Partner Elgin Energy has created a Corporate PPA Guide. It will be available to download ahead of the show on the EMEX website www.emexlondon.com/PPA-GUIDE

Revised ISO 50001 energy management system was published on 21st August 2018. This mean that by 20 August 2021, all certificates shall be transitioned to ISO 50001:2018 to ensure continued validity. After the transition period, certificates to the 2011-edition cease to be valid.

While 3 years may seem like a long time, we know that the transition journey runs smoother when companies prepare and plan well to avoid a rushed process. We recommend getting familiar with the new version and identifying gaps sooner rather than later.

Attendees will not only get a brief on the updates key tools in ISO 50001 and how organisations can prepare, implement and transition to the new ISO 50001 but also hear how organisations approached the route to compliance in the past. Certification bodies, such as **BSI**, **DNV GL**, **SGS** and **BRE** will be at EMEX 2018 to help existing and new customers to transition or get certified to the revised standard.

With such diverse solutions, knowledge and expertise on offer, it is not surprising that thousands of small and medium businesses, as well as household names such as NHS, British Airways, Harrods, Hilton Worldwide, Boots, RBS, TATA, British Land, Ministry of Defence, AstraZeneca, Sodexo, Bellrock, BAE Systems, Co-Operative Group, Ofgem, Network Rail, MITIE, CBRE, Whitbread, Mitchells and Butlers, British Telecom, House of Fraser, and many county and city councils are already registered to attend.

EMEX takes place on Wednesday 21st and Thursday 22nd November at ExCeL in London.

REGISTER FOR FREE www.emexlondon.com

by CPA Engineered Solutions Ltd

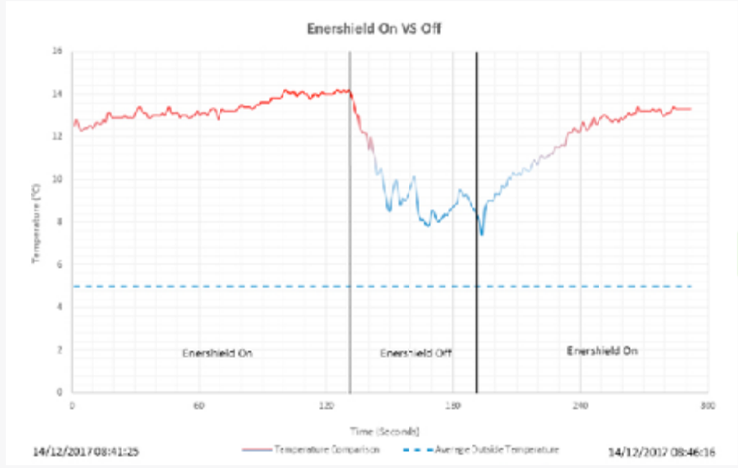
Gatwick Airport's North Terminal Case Study

The winter of 2017 will be remembered by many for the 'beast from the east' bringing biting Arctic temperatures and prolonged snowfall. It's at times like these that frequently used doors and entrances are the enemy, not just for the occupants but also on energy management and efficiency.

At Gatwick airport's North Terminal, a high footfall 3.6 m wide entrance on the ground floor lobby is frequently used and with no internal doors the area was being left exposed to the external conditions. During the winter; when the terminal concourse was being heated, the presence of a significant stack effect was inducing a negative pressure and in turn drawing cold external air in and up through the stairwell to the upper floors, making it difficult to maintain the concourse temperature, especially during extreme winter conditions.

We carried out a detailed survey of the area, which highlighted the negative pressure. We knew that we had to have a solution that would help HVAC efficiency allowing the temperature to be maintained, ensuring comfort for everyone without causing disruption at the entrance.

We proposed the installation of an air barrier system, manufactured and designed to the exact door width and positioned horizontally across each of the two internal lobby door openings. The air barrier is designed to create a seal by re-circulating the internal heated air across the open door and creates an environmental separation between the external conditions and the ground floor concourse, reducing the ingress of external air, and stabilises the internal temperature. Our post installation temperature measurement shows that within one minute of the air barrier being switched off, there was a decrease in the internal temperature of up to 7°C. With more improvements close to the entrances being planned to further increase the temperature and improve comfort, Gatwick's North Terminal is certainly ensuring your experience is a comfortable one.



In addition to our post-installation report, an independent CFD (computerised fluid dynamic) report was commissioned by the client to help understand how more effective an air barrier system performs under set conditions when compared to alternative overdoor heated technologies.

For further information on air barrier technology, please visit www.cpa-group.com

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Come visit our stand E20 @ Emex or contact us at energysolutionssales@edfenergy.com