

The case for proactive energy management

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Many organisations carry a multi-million pound energy bill as a largely unchallenged overhead, without realising what could be achieved with a more proactive approach. Let's explore a typical case, some core themes, and see how ten simple questions might reframe how energy is viewed within your organisation.

Do you spend more on energy than on maintenance?

This question helps to get people thinking about energy. It is often the case that the energy bill is bigger than, or comparable in scale, to the annual maintenance budget.

We'll reference a fictitious, but in many cases representative, engineering maintenance (Hard FM) team. They have a total annual budget of ~£12m per year. Within this budget they have a ~£4m energy cost, plus ~£2m of water and waste costs.

This sort of split is found in many organisations, including the NHS, universities, manufacturing facilities, school academy trusts, hospitality venues, and commercial real estate.

Note that, even if the energy budget is held elsewhere in the organisation, this is still a meaningful comparison because the engineering team control the equipment that uses most of the energy paid for.

To tease out this context for your organisation, ask the following questions:

1. What is the total annual budget for your engineering maintenance / Hard FM team?

2. How does this compare to the energy / 'sustainability' budget? What is your annual expenditure on energy, water, and waste?

Do you have at least one full time energy manager, with the right skills, sitting in the right part of the organisation?

Many organisations have cut back on the energy manager role, e.g. making it part-time, perhaps also combining it with other duties, and/or cutting it to a junior banding and a low rate of pay.

Our case organisation has a 0.5 FTE energy manager in a relatively junior position within the sustainability team. They are not confident with numbers, data, or Excel and they only have an 'arms length' connection to the engineering and maintenance team.

The following questions are worth exploring for your organisation:

3. Do you have at least one full time Energy Manager? If so, should you support this role with an Energy Analyst? Bear in mind that a part time energy manager is likely to cost you money, while a full time energy manager saves you money through the savings they generate. This is because the first ~30 - 40% of an energy manager's time is taken up with compliance and data gathering activities. These build a foundation for action, but don't directly save energy, costs, or carbon. Therefore, having a part time energy manager often means you pay half the salary for none of the energy savings. If you extend this role to being full time, then the Energy Manager can progress past the compliance and reporting requirements of the role and find time for proactive energy management. Furthermore, if your organisation spends a few million pounds on energy per year, it is likely beneficial to have an entry grade 'Energy Analyst' role, allowing a senior Energy Manager to

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focus full time upon saving energy.

If you have a full time Energy Manager on £65k per year, plus an Energy Analyst on £35k per year, then your salary bill with say 40% on costs (pension contributions, employer's NI, internal overheads, etc.) will be £140k per annum. Compare this £0.14m per year salary bill to your ~£4m per year energy bill and the salary costs are around 3.5% of the annual energy budget. Your energy team should deliver energy savings of at least 5%, and over time they should hope to achieve and maintain savings of at least 15 to 30%. Bear in mind also that in absence of this team, you will likely see at least a 5% increase in energy costs as the budget is left unmanaged. In other words, you'd still be paying the equivalent of the salaries you avoided, just in the form of uplifted, unmanaged energy costs. Better to spend the money on salaries and achieve a net saving, than to leave the energy budget unmanaged and lose the money as additional energy expenditure.

Finally, don't be tempted to pinch on the salaries, as it is a competitive market for good energy managers who can actually deliver savings. Offering a weak salary will either lead to: a) recruitment and retention issues for good candidates, or b) locking in lost energy saving opportunities if you recruit a weaker candidate that struggles to deliver savings and may never leave when they struggle to find career progression beyond the role you've given them.

4. Does your energy team have the right skills and do they sit in the right place within your organisation? It is common to meet energy managers who openly say they aren't confident dealing with numbers and that they don't like dealing with the engineering team. The main message here is: don't confuse a passion for sustainability with a passion or aptitude for delivering energy savings. The two overlap in many cases, however they are by no means the same thing. Energy management is a technical and data heavy subject. Hire an energy manager with a demonstrable passion for data, problem solving and engineering who wants to learn about how equipment works and how it can be optimised. Rather than sit them within the wider central sustainability team, in many cases it makes sense to sit them within the engineering team, reporting to someone like the engineering manager, or head of estates.

Note that this doesn't stop you giving them a dotted line of reporting to the sustainability team for things like staff engagement and net zero tracking. This approach puts them in the thick of where energy is used and controlled, giving access to the teams and systems they need to learn from and influence. Include questions and activities as part of the recruitment process which ensure you end up with a numerate energy manager who likes data, engineering systems and problem solving. Once in post, support the Energy Analyst to work towards Chartered Energy Manager for their career progression. Make a relevant further chartership a requirement in the person specification for the full Energy Manager's job description, e.g. CEng, CIBSE and so on.

What might proactive energy management be worth to your organisation?

To explore this question, let's return to the sample Hard FM team with an annual total budget of £12m per annum, energy costs of £4m per annum and water and waste costs of another £2m per annum.

Although they had invested little in energy savings, the other half of the team was busy trying to deliver against a 10% cost improvement (CIP) for the department as a whole. They were making maintenance staff redundant and cutting costs on safety critical maintenance contracts to hit their CIP target. This gave the opportunity to reframe energy, water and waste savings away from 'environmental actions' and towards 'protecting jobs', 'investing in career development', and 'maintaining safety standards'.

5. With appropriate support and resources, how much of the engineering / 'Hard FM' team's annual savings target could be met from energy, water and waste savings? What steps would be required to make this possible? The case organisation decided to work towards 20% savings in energy, water and waste. Given that these costs represented half the department's operational budget, this approach could in theory carry the whole department's 10% CIP target, i.e. making energy, water and waste savings key themes for the department as a whole. With this new framing, they:

- Reinstated the Waste Manager role that had previously been cut.
- Reinstated the Energy Analyst role that had previously been cut.
- Upgraded the Energy Manager role and recruited a Chartered Engineer to take it forwards as a member of the estates management team, sitting alongside the heads of electrical and mechanical engineering, plus the head building surveyor.
- Instigated Lean/Six Sigma training for the engineering team to build upon opportunities to tighten systems and work towards continuous improvements that could deliver savings.
- Upgraded the engineering job descriptions and bandings from the management team through to the fitters. This process built energy, water and waste management into the whole team's roles. This helped to sell the changes, whilst also mitigating recruitment and retention challenges by offering more competitive salaries.
- Hired a BMS consultant to flag and implement pilot projects to demonstrate savings that could be scaled across the estate.

With this example as a reference point – how might you reframe energy management as a significant opportunity for your organisation, and in particular for the engineering team? What would you need to change to make the savings possible?

Sample opportunities to help build the business case

Let's explore some examples of opportunities that a proactive approach could unlock.

6. What COMPLIANCE opportunities does your organisation face?

There are many to explore, such as:

- Climate Change Agreements (CCA) – CCL discount.
- CHP Quality Assurance scheme (CHPQA) - CCL discount.
- Domestic accommodation & charity usage - CCL & VAT discount.
- UK ETS - optimised simplified compliance costs.
- Demand side response opportunities (balancing mechanism, frequency response, reserve services, DNO services, NIV chasing, Capacity market). Be paid to help balance the grid, e.g. by partnering with an aggregator who coordinates responses.
- TM44 inspections of refrigerant systems, driving savings.
- Energy Savings Opportunity Scheme (ESOS), driving savings.
- Streamlined Energy and Carbon Reporting (SECR), driving savings.

For example, an NHS Trust that received support on this topic went away to check their CHPQA paperwork and found that they hadn't been taking the final step in the reporting process. Once fixed, they received a £300k rebate on the Climate Change Levy tax and ongoing annual savings.

7. What PROCUREMENT opportunities does your organisation face?

Although it is impossible to have a perfect energy procurement strategy, there are a number of ways to get it badly wrong. The simplest one is to avoid 'out of contract' rates. If you have a large portfolio of properties, such as would be seen by a local authority, then unless the contracts are proactively managed, they will fall out of contract and onto punitive default rates. This was seen at a local authority where they cut the energy analyst post and subsequently wasted many multiples of the salary paying out-of-contract rates for properties in their unmanaged portfolio of energy contracts.

Another example is that a school successfully challenged existing energy broker commission such that in this single activity they reduced gas costs by 20% and electricity costs by 5%. Context being that the broker had applied a flat 'per kWh' rate to both electricity and gas - ok(ish) on electricity, but punitive on the gas contract.

8. What CONTROL opportunities does your organisation face?

Many organisations invest in sophisticated Building Management Systems that have the potential to deliver huge improvements in comfort and energy savings through optimised control of the estate.

However, if the estates team doesn't receive appropriate training on the system and appropriate oversight from a competent energy manager, then the system is often neglected.



In many cases this leads to it being overridden/disabled by fitters placing it 'in hand'. It isn't uncommon for at least one-third of the BMS at many organisations to be disabled as working 'in hand', at which point you've lost many opportunities to provide comfort to occupants and to achieve energy savings.

The fan law shows just how sensitive energy consumption is to control settings. It states that the energy used by a fan or a pump, such as in heating and ventilation systems, which represent a large portion of energy bills, is related to the cube of the speed. In other words, doubling the speed of a fan or pump results in eight times the energy consumption (2x2x2=8). Conversely, halving the speed is nearly a 90% energy saving (0.5 x0.5 x0.5 = 12.5% of the energy use remains, i.e. an 87.5% saving). Hence the very high level of impact of leaving parts of the BMS 'in hand'.

Recent visits to a large plantroom for a London-based University showed that all air handling units in that zone had been left running 'in hand' for over 3 years. This disabled the BMS control and it was estimated that this failure cost the University around £50,000 per year, or £150,000 over the three years, in unnecessary and easily avoided energy costs.

9. What FUNDING opportunities are available to your organisation?

There are many diverse funding opportunities available in the form of grants, low cost loans, or 'no win no fee' energy savings services. With an appropriately resourced energy team, you'll be well placed to track and make the most of these.

Here are two examples of the sorts of funding that your Energy Manager can seek out:

- AG Barr plc won a grant for £2,181,664 from the Industrial Energy Transformation Fund (IETF) for energy efficiency and decarbonisation of industrial processes through heat pump technology. *https://www.gov.uk/government/publications/industrial-energy-transformation-fund-ietf-competition-winners*
- Hull University Teaching Hospitals NHS Trust was awarded a grant of £4.2m to install an 11,000-panel solar farm, saving them about £250,000 a month in energy bills. *https://www.england.nhs.uk/greenernhs/whats-already-happening/harnessing-solar-power-at-hull-university-teaching-hospitals-nhs-trust/*

10. What LEADERSHIP opportunities are available to your organisation?

Finally, looking beyond best practice, many organisations are building upon their ISO systems of 9001 for quality, 45001 for safety, and 14001 for environment, by extending them into ISO 50001 for energy. Doing so offers many benefits, such as delivering competitive advantage and cost reduction, new business via enhanced tender returns/meeting customer requirements, enhanced reputation, employee engagement, regulatory compliance and risk management, increased efficiency and significant contributions to net zero targets.

An example of how this leadership approach can help foster progress and investment is that one requirement of ISO 50001 is to appraise energy costs on a lifecycle basis. This is a significant improvement, as things that are cheap to buy tend to be expensive to run.

A good energy manager with basic engineering knowledge can make an estimate of lifecycle costs and should be able to add significant value to the discussion by helping their organisation:

- save money
- support investment in new equipment
- improve reliability
- reduce carbon emissions and
- open up discussions about savings available by implementing demand-led control.

Hopefully the ten questions explored here can help you identify the opportunities that proactive energy management can offer your organisation. Hopefully it is also clear how important it is to have an appropriately sized energy management team, with the relevant experience and knowledge that is located within the right part of your organisation.

Remember that it is very hard to stay still. The opportunity cost of not committing to this approach won't be nothing, it will be steadily rising energy costs and compliance risks. Whereas a suitably sized and appropriately staffed energy team will deliver ongoing savings and continuous improvement year on year.

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The Business Case for Energy Management

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Questions

Question 1. Proactive energy management should deliver savings of at least:
- ☐ 0-5%
- ☐ 5-10%
- ☐ 10-15%
- ☐ 15% and often as high as 30% or more.

Question 2. Does it make sense to cut the energy manager role to be part-time?
- ☐ Yes, the Energy Manager role is largely administrative.
- ☐ No, a part time Energy Manager will be forced to prioritise compliance and reporting activities, leaving them little to no time for proactive energy management.
- ☐ No, let's instead cut the rate of pay.
- ☐ No, let's instead have the role cover: water/waste/sustainability/HSE.

Question 3. Why is it a false economy not to pay a competitive salary for energy roles?
- ☐ There is a competitive market for good energy professionals who can actually deliver savings.
- ☐ Offering a weak salary risks recruitment and retention issues for strong candidates.
- ☐ Offering a weak salary risks huge lost energy savings if you recruit a weaker candidate.
- ☐ All of the above.

Question 4. What can you do to recruit an Energy Manager that likes data and is well placed to engage the engineering team where most of your energy is used and managed?
- ☐ Place the role within the engineering team.
- ☐ Include a maths /Excel exercise in the recruitment process, plus a problem solving challenge related to energy systems optimisation.
- ☐ Seek out chartered candidates, e.g. CEng, CIBSE, CEM.
- ☐ All of the above.

Question 5. What is the impact of leaving parts of the building management system (BMS) in hand?
- ☐ Doing this removes BMS control, wasting energy and reducing occupant comfort.
- ☐ It is ok in an emergency, but not as a permanent solution.
- ☐ Doing so can cost many thousands of pounds a year.
- ☐ All of the above.

Question 6. The fan law shows the scale of opportunities for control improvements. Which of the following is false?
- ☐ The power used by a fan or pump varies with the cube of the speed it is set at.
- ☐ Unfortunately, enhanced control is prohibitively expensive to implement.
- ☐ Doubling the speed of a fan or pump increases energy consumption by eight times. Conversely, a 50% speed reduction delivers a ~90% energy saving.
- ☐ Fans and pumps are significant energy users, e.g. in heating and ventilation systems.

Question 7. How can lifecycle costing help save energy?
- ☐ Operational energy costs are significant over the lifetime of a project.
- ☐ Examining capital costs alone can often be misleading, since capital costs are often lowest for less efficient equipment that ends up being very expensive to run.
- ☐ Lifecycle costing may capture other benefits, e.g. reduced maintenance costs.
- ☐ All of the above.

Question 8. How can the ability of an Energy Manager to perform basic energy calculations support lifecycle cost analysis?
- ☐ By developing a model of the energy system and the options being explored.
- ☐ By helping to estimate energy consumption, savings and costs.
- ☐ By being able to sense-check numbers supplied by others.
- ☐ All of the above.

Question 9. Your energy budget is £5m per annum. You hire an Energy Manager on £65k pa, with 40% additional on costs. What is the break-even energy saving to cover this post?
- ☐ 1.8%
- ☐ 5.6%
- ☐ 13.2%
- ☐ 22%

Question 10. Following early savings generated by the Energy Manager, you also recruit an Energy Analyst on £35k per annum (plus 40% on costs). You then target a 20% energy saving next year. Which of the following are true?
- ☐ An uplift of just 1% in energy savings would carry the Energy Analyst role.
- ☐ Delivering the 20% energy reduction would offer a net saving of £860k (i.e. even once staff costs are netted off).
- ☐ The cost of inaction is not nothing: if the organisation does not invest in an energy team, then a small uplift in the unmanaged energy bill of just 2.8% would end up costing the same as the staff costs outlined in this scenario.
- ☐ All of the above.

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