Energy saving retro-fits with no upfront investment
By Richard Scott, Head of Consultancy at E.ON

For those charged with finding ways to achieve genuine financial savings for a business or organisation, the energy efficiency of buildings and facilities should now be at the top of the priority list.

Energy efficiency in buildings is an area of significant innovation – both in terms of the inherent technology, advanced control processes and investment support mechanisms enabling its uptake. For example, there is now a contractually binding method of reducing energy consumption that facilitates capital investment and guarantees lowers energy consumption without compromising operations or comfort levels. As yet however, just a small minority of UK organisations are taking advantage of it.

There are two things likely to gain broad approval in the current climate; financial guarantees and reduced or even zero, upfront costs. With this in mind and with on-going uncertainty around energy pricing there can hardly be a better time to start talking seriously about energy performance contracting in the UK.

What is an Energy Performance Contract?
An energy performance contract (EPC) is fundamentally a partnership between a customer, or client, and an energy services company (ESCo), designed to save energy for as long as possible. Based around an alternative means of facilitating investment in relevant and proven technologies, it allows an organisation to implement the key changes needed to improve the energy efficiency of its buildings or facilities without having to raise the required capital. A combination of the best energy conservation methods are designed to suit the specific circumstances of the client; these are then installed, commissioned and potentially even funded by the EPC provider, such as E.ON. The client need not make any capital investment, but instead pay a monthly service fee to the ESCo with the contract entirely guaranteeing a level of energy savings sufficient to more than cover the fees charged. There is no pay-back period to consider, as zero capital has been spent by the client, meaning they are cash positive in the first year.

The EPC provider brings extensive energy saving expertise, accredited technologies and saving guarantees – and can act as an investor if the client chooses not to invest directly itself. By combining multiple technologies and an on-going optimisation service, the returns for a client choosing to invest its own capital can be very attractive. Where capital is tight and the EPC provider invests, the savings guarantee ensures the client is cash positive from year one, entirely removing any nagging doubt that the technology may not deliver the savings the manufacturer promised. The EPC delivers the peace of mind that the savings will be achieved or the provider will otherwise be liable to invest further in order to close the gap. As well as helping businesses, local authorities, and other organisations to improve building performance, meet environmental obligations and achieve lower maintenance costs through investment in modern building services, the client will also retain all the additional future savings after the contract has come to an end.

At E.ON our EPC proposition offers an end-to-end service to the client which includes:

- Assessment of the client's building(s) for EPC suitability;
- Modelling of existing energy consumption and creating a baseline;
- Design of a complete building services solution to deliver energy savings;
- Project management for the audit, design and delivery of the investment;
- Development of operating and maintenance plans to deliver energy savings;
- Co-ordination of energy plans with the Client's existing facilities managers; and
- Monitoring and verification of energy savings over the contract period.
The level of the guarantee is calculated by our Energy Efficiency Team, following evaluation of the client’s existing energy consumption, iterative technical designs to ensure client approval, and energy modelling. Also considered is the careful selection of both technologies and subcontractors with a proven record in delivering specialist energy savings in specific industries and environments. The length of the contract term is typically 8 to 12 years, although longer EPCs are often seen as more beneficial as savings are guaranteed across its term. In instances where the provider is also the investor, there is still no pay-back period and the service fees are always less than the value of the savings.

The current UK market
With energy savings contractually guaranteed in this way, long-term EPC agreements represent an attractive and low risk opportunity for clients to manage energy consumption, carbon emissions and cost. Despite these benefits, however, uptake in the UK remains relatively low. There are various estimates around the current level of EPC activity in the UK, all putting the overall market value significantly below £200m which is, at most, a tenth of the value seen in the US. It is clear that a great deal is still to be done to break the perceived barriers in this country and capture energy savings that might otherwise be lost.

E.ON recently commissioned independent research into awareness and perceptions of EPCs, based on qualitative interviews with senior decision-makers and consultants in the field of energy and environment. The study found that even some experienced professionals were unfamiliar with the opportunity, understandably confusing it with the Energy Performance Certificates required for efficiency ratings when selling domestic and non-domestic buildings. Perhaps more significantly we found that, while guaranteed savings and funded investment in technologies is understood and has significant appeal, there remains resistance. This seems largely due to apprehension about committing the organisation to a long-term arrangement, as well as a degree of scepticism on the potential to achieve the guaranteed level of savings suggested.

Perhaps the industry needs an even more powerful word than ‘guarantee’. Even without such a change, we certainly need to do a better job providing practical examples of how EPCs are saving real organisations significant amounts of money. One particular case in point is the Empire State Building in New York, which recently signed its first EPC to guarantee 15 years of savings.

The EPC model is starting to gather support, with organisations such as the UK Green Building Council (UKGBC) pointing to the potential benefits for the private sector. Richard Griffiths, Policy and Campaigns Consultant at UKGBC, comments: “Over recent years, the amount of regulation seeking to drive energy efficiency in non-domestic buildings has increased significantly. On top of this, private commercial landlords are faced with regulations from 2018 that will effectively outlaw the rental of low efficiency buildings. So, while the take up of EPCs has so far been limited, there are certainly a host of policy drivers that look set to make their use more attractive and widespread. That’s not to mention the demand that will be generated as a result of increases in energy prices.”

Learning from the public sector
In the UK, the public sector is very much leading the way when it comes to entering EPC partnerships; the majority being implemented in the local government, education, and health markets. Inevitably this is partly due to budget pressures, but it also comes down to the availability of agreed procurement frameworks for running an EPC. For example, government initiatives such as RE:FIT have helped to boost awareness and uptake amongst public sector institutions. Under the RE:FIT framework, the design, implementation and maintenance of the EPC for public sector buildings can be funded entirely through public funds or the EPC provider.
EPCs are a core activity for E.ON’s Energy Efficiency Team. Our aim is to be proactive in this space and we have become one of the most successful providers under the RE:FIT framework, recently winning our fifth contract. To date these include Newham University Hospital in East London and portfolio partnerships with Ealing and Leeds City Council (see case study box out). From our experience working successfully within the public sector we can demonstrate the true value of EPCs, with these projects delivering guaranteed savings of up to 30 per cent on annual energy consumption. The private sector is missing out on an attractive proposition.

**Removing the fear factor for business**

EPCs are neither exotic nor particularly new, and they are a particularly low risk proposition for UK organisations. Aside from the fact this is already a major and well established market in North America and Australia, EPCs are already generating clear and significant value for those adopting them in the UK.

While the spread of EPC end users in the US is also heavily skewed to hospitals and universities, there is still a strong and growing industrial and commercial market. There are undeniably some fundamental differences between the US and UK in terms of governance and general business culture that may explain the divergence in uptake of EPCs, but the benefit to business is universal. As well as providing guaranteed long-term energy performance security, they can empower clients to further reduce energy consumption, capture otherwise wasted energy, help achieve environmental and corporate social responsibility targets, and, subject to approval by the client’s auditor, can be treated as an ‘off balance sheet’ solution.

Entering an EPC partnership has the potential to be hugely beneficial for many types of organisation, but is something that should be taken into serious consideration for more energy intensive environments. For companies operating in sectors with typically high energy use such as manufacturing, data centre hosting, or food processing, utility requirements may be quite complex and represent a significant percentage of overall business costs. The solutions required for these sectors may be larger in scale, but can still be guaranteed and funded by EPC providers like E.ON.

With evidence mounting on the benefits of the EPC model in the UK and abroad, now is the time for both public and private sector organisations to embrace the opportunities provided by these partnerships. For those looking to get ahead of the curve in terms of efficiency this offers a secure and viable solution.

**CASE STUDY 1: Ealing Council**

**The background**

E.ON is working with Ealing Council on a major energy efficiency upgrade to three council-owned buildings - including the Town Hall - that will reduce the carbon footprint by 1,122 tonnes per year and guarantee energy consumption savings of 29% for the Council.

The work is being carried out under an Energy Performance Contract (EPC) between E.ON and Ealing Council that will help finance the designed solution of energy conservation measures within a fixed budget.

Completed in June 2013, this project is part of the Greater London Authority’s RE:FIT Framework set up to support public sector organisations reduce London’s CO2 emissions by 60% of 1990 levels by 2025.
The project
Following an initial feasibility study and the creation of a bespoke designed solution, the energy conservation measures included:

- boiler optimisation;
- air handling unit upgrades;
- air conditioning replacements;
- building management system upgrade; and
- installation of a new lighting control system that offers presence detection, daylight dimming, manual override switching and time control.

The EPC agreement between E.ON and Ealing Council will deliver the technology the Council needs to improve the energy efficiency of its buildings and facilities, with the incremental savings achieving an investment payback period of just less than five and a half years.

The buildings benefiting from the work are:

- Ealing Town Hall;
- Perceval House – an office building housing over 1,500 council employees; and
- Greenford Hall - used as a venue for weddings and other functions.

The technology

**Improved ventilation and temperature controls**

The mechanical ventilation system in Perceval House was upgraded by replacing and recalibrating a number of CO2 sensors. As a result, the system is now able to detect when CO2 levels are above the recommended guidelines and increases the level of fresh air being drawn into the building.

The mechanical ventilation system was also improved to ensure less variation in the internal building temperatures. All floors will now be held at a constant temperature of 21°C in the summer and 23°C in the winter, thereby improving the comfort conditions for both Council staff and visitors. The Building Management System detects if the temperature rises or falls by more than 0.5°C from the desired temperatures and prompts the ventilation system to provide heating or cooling to specific building areas as required.

**A new lighting system**

A new lighting control system that optimises the use of the existing light fittings was installed in Perceval House and integrated into the Council’s Building Management System.

The lighting controls achieve energy savings by automatically switching off lights in unoccupied building areas and the control system dims the office floor lighting dependant on the level of natural daylight that creates a more pleasant working environment for Council staff and visitors.

**The benefits of this project include:**

- Guaranteed energy consumption savings of 29%;
- Reduced carbon footprint of 1,222 tonnes per year that equates to financial savings of £192,586 per year based on current pricing levels;
- Short investment payback period of under six years;
- Improved control of heating, cooling and lighting throughout the buildings; and
- Improved comfort and lighting for Council employees working in the buildings.

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**CASE STUDY 2: Leeds City Council**
The background
E.ON is working with Leeds City Council to significantly reduce the energy consumption and carbon footprint of a selected portfolio of nine public buildings throughout the city, including leisure centres, schools, and data centres.

The seven-year contract is calculated to achieve a 26% saving in energy costs through a range of energy-saving measures. In order to help finance the work, E.ON has developed an Energy Performance Contract (EPC) with Leeds City Council which guarantees the level of energy savings achieved by the designed solution within a fixed budget. The city-wide project is part of the RE:FIT initiative.

The benefits
The benefits of this project include:
- The guaranteed savings pay for the investment;
- More effective control of heating, cooling and lighting throughout the buildings;
- Improved energy efficiency using upgraded lamps, motion detection and daylight harvesting;
- Reduced energy consumption through voltage and boiler optimisation; and
- Reduced heat loss via swimming pool covers and fast-acting vehicle access doors.

Retain capital
Polly Cook, Executive Project Manager, Leeds City Council said: "This is an important step forwards for the city of Leeds as we move towards a low-carbon, energy-efficient future. By offering us the flexibility of an Energy Performance Contract, E.ON has enabled us to invest in important sustainability measures that would have been difficult to finance otherwise. We're looking forward to realising the expected cost savings following the completion of the improvements."

The project
E.ON is working to install and upgrade the buildings’ facilities to improve energy efficiency and reduce carbon emissions. The improvement work varies between sites but includes:
- boiler and voltage optimisation;
- air handling unit upgrades;
- building management system upgrade renewal;
- lighting renewal; and
- pool cover installation.

The EPC will deliver the technology the Council needs to improve the energy efficiency of its buildings and facilities, with the incremental savings achieved paying for the investment. The nine buildings benefiting from the work are:
- Aireborough, Kirkstall, Pudsey and Wetherby leisure centres;
- Apex House Data Centre;
- Torre Road Transport Centre;
- Middleton Park Office;
- Prince Henry’s Grammar School; and
- Little London Primary School.

The city-wide project is part of the RE:FIT initiative, which is being rolled out throughout the UK to assist public bodies to significantly reduce their carbon emissions.
Notes to Editors
1 Building Services Research Information Association, 2006, review of EPC market, Frost & Sullivan – Credo Research
2 Based on a reduction of 2,996,328 kWh against a baseline of 9,432,525 kWh
3 http://www.refit.org.uk/what-refit/background
4 Based on a baseline of 3,771 tonnes CO₂ and based on an emission factor of 0.5246kg CO₂/kWh of electricity and 0.1836kg CO₂/kWh of gas
5 Based on a reduction of 6,604,936 kWh against a baseline of 20,282,124 kWh given an electricity price of 7.5501 ppkWh and a gas price of 2.3796 ppkWh.

- E.ON is one of the UK’s leading power and gas companies - generating electricity, retailing power and gas, developing gas storage and undertaking gas and oil exploration and production. It is part of the E.ON group, one of the world's largest investor-owned power and gas companies. E.ON employs around 12,000 people in the UK and more than 72,000 worldwide;
- In the UK, E.ON supplies power and gas to around five million domestic, small and medium-sized enterprise and industrial. E.ON also offers innovative energy services and technologies tailored to meet its customers' needs, and is helping customers become energy efficient by encouraging them to insulate their homes, moderate their energy usage and even generate their own power;
- E.ON continues to identify and discuss changes with customers through its 28,000-strong YourSay panel, its 1,000-strong MySay employee panel and through discussions with consumer advocacy groups such as Which? and Consumer Futures. Changes made to date include: helping customers control their bills: fair prices, simple products, transparent profits, a fairer way of paying: providing stability to help households budget, improving customer service: consistency, easier contact, and the confidence to complain;
- E.ON has topped several categories – including best for overall customer satisfaction, best value for money and best reward scheme – to be voted Britain’s favourite energy supplier 2012 in the uSwitch.com Customer Satisfaction Awards. The independent report and awards are published annually and are based on a YouGov poll of over 5,000 energy customers;
- E.ON’s generation portfolio includes world-class gas-, coal- and biomass-fired power stations. E.ON is a market leader in combined heat and power (CHP), and is one of the UK’s leading green generators;
- One of the many ways E.ON leads the energy industry is through its commitment to market liquidity and transparency as evidenced by its actions on the day-ahead UK power markets including the N2EX auction. E.ON was the first company to sign a gross-bidding agreement with N2EX.