This guide discusses the incorporation of energy performance guarantees into service contracts in order to transfer some of the energy savings risk from the customer to the supplier. It identifies a range of such service contract models and examines the use of energy savings to pay down the cost of energy efficiency investments, in some cases using external finance.

A number of common Energy Performance Contracts (EPCs) models - shared savings, guaranteed savings and variable contract term – are explained and a number of short case studies are outlined. It also illustrates the EPC procurement stages and identifies contractual considerations that are of particular relevance to public sector organisations.

The guide is of relevance to public and private sector managers interested in alternative methods of achieving and financing energy efficiency, as well as ESCOs. It is anticipated that the guide will also assist in achieving a common understanding of terminology and contract models, thereby assisting in market development.

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Traditional Approach to Energy Management

Organisations wishing to improve their energy efficiency and reduce energy-related costs may engage contractors, product suppliers and service providers to assist. Traditionally organisations might start by engaging an energy consultant to conduct an energy survey (see bottom of the ladder below). This survey identifies opportunities for energy savings, ranging from operating practices (such as heating schedules), to maintenance (such as a faulty cooling valve), to controls (such as occupancy control of lights), to equipment investments (such as efficient light fittings or boilers). The organisation then makes some changes directly, generally operational, and arranges for their own maintenance staff or a maintenance contractor to resolve the maintenance issues. Other works – controls and equipment upgrades - require substantial effort by the customer to engage design consultants and contractors to undertake the works. New equipment may be purchased or leased. The organisation may also arrange an ongoing energy management service, possibly with the original energy consultant, to support their efforts and implement an energy management programme.

This fragmented approach calls for the organisation to commit management time and financial resources to procuring and achieving energy savings. As many organisations don’t have energy management and project management capability in house, they are uncertain that savings will materialise: indeed, the customer organisation takes the energy performance risk that savings will be achieved as predicted. A common outcome is that some energy saving opportunities are implemented (or partially implemented), but the full potential for energy savings is not achieved.

Fig.1 Traditional Approach to Energy Management
Internal Energy Management with Support from External Suppliers
To address this risk to the customer organisation that savings do not materialise, energy performance guarantees can be incorporated into contracts with service providers, contractors or product suppliers, so that some or all of the performance risk is transferred to the supplier. For convenience, we refer to this mix of service providers, contractors and product suppliers as ‘Energy Service Companies’. These ESCOs may also provide or source finance for the energy efficiency investment, but that is not a prerequisite.

The ladder (below) illustrates a range of energy product and service contract models that incorporate performance guarantees. The higher a service is on the ladder the more comprehensive the retrofits, the more performance risk is assumed by the ESCO, and the greater the access to external capital (if needed). However, comprehensive retrofits and use of external capital has implications:

- A larger contract size to cover the transaction cost.
- A longer contract duration to cut deeper into energy use.
- A more specialised and longer procurement process.
- A greater emphasis on the measurement and verifications of savings.

Using procurement frameworks and model contracts can help simplify the procurement effort and minimise transaction costs.

**Fig. 2 Alternative Approach to Energy Management**

**Energy Service Companies take Performance Risk**
Integrated Energy Contract
This is a combination of an Energy Supply Contract, possibly involving a CHP to supply heat and power, and an Energy Performance Contract, possibly involving lighting and BMS upgrades, fabric improvements, etc.

Energy Performance Contracts

Shared Savings
The ESCO designs, finances and implements the project; verifies energy savings; and shares an agreed percentage of the actual energy savings over a fixed period with the customer. The ESCO may receive financing directly from a third party.

Guaranteed Savings
The ESCO designs and implements the project and guarantees the energy savings. If the savings are less than expected, the ESCO covers the shortfall. A third party provides the financing directly to the customer; the ESCO may facilitate the financing arrangements.

Variable Contract Term
The ESCO designs, finances and implements the project; verifies energy savings. If the savings are less than expected, the contract term can be extended to allow the ESCO recover its full payment. In the First Out variation of this, the ESCO takes all the savings until it has received its full payment.

(Local) Energy Supply Contract
The ESCO takes over operation and maintenance of the equipment and sells the output (steam, heating, cooling, lighting) to the customer. Costs for all equipment upgrades, renewals, repairs are borne by the ESCO, but ownership typically remains with the customer. Simpler variations include CHP or biomass heat supply contracts.

Equipment Leasing/Supplier Credit with Performance Guarantee and Payments Matched to Energy Savings
The supplier installs the equipment and may maintain it; lease/credit payments financed by verified savings. Ownership generally transfers at the end of a lease, whereas ownership may transfer on supply in the case of a credit arrangement.

Energy Project Design with Performance Payment
Design engineers guarantee a project/projects will achieve a certain level of energy savings, with a portion of the fees linked to verification of these savings. This incentivises the design engineer to stay with the project until issues that may affect savings are resolved.

Facilities or Maintenance Management Service with Performance-based Payments
An energy performance indicator, such as DEC rating, is incorporated into the contract, thus bringing it into the service provider’s frame. May include a financial incentive to use their services to improve the efficiency of the facility.

Energy Management Service with Performance-based Payments
Service provider conducts an audit and assists with project implementation, possibly including ongoing energy management activities such as staff awareness. A performance-based fee can include penalty/bonus if energy savings are less than/greater than agreed (‘gain share’ arrangement).

Basic Energy Performance Payments & Guarantees
There are a range of options when it comes to the ESCO taking some of the risk that a project may not deliver the energy savings originally envisaged. For instance, in a performance payment arrangement it might be agreed that 80% of the ESCOs fees are fixed, but 20% is variable based on the extent to which savings materialise and are verified as projected. In a case where an ESCO is delivering savings through facility and energy management activities, rather than investments, a gain-share arrangement could be that the ESCO gets a percentage of the value of the savings achieved. In a performance guarantee, the ESCO might only receive the final payment once it demonstrates that savings reach a particular level, either in energy or percentage terms. In all these cases the ESCO supplies a product or service and assumes a degree of performance risk, but much of the risk remains with the customer; the ESCO’s payment is not entirely or directly based on the level of savings achieved.
The top rungs of the ladder are comprehensive Energy Performance Contracts (as distinct from performance guarantees or payments). Such EPCs are not structured around the supply of a physical product or service, but around the desired outcome (or customer utility) such as energy savings and/or equipment renewal. These are generally long term contractual agreements where the customer benefits from new or upgraded energy equipment, and the ESCO’s payment is directly tied to the energy savings achieved. The cost of investment can be paid back from the savings, and if the savings fall short, the ESCO covers the shortfall. These comprehensive EPCs typically involve the entire building or estate as a single entity in which to deliver energy savings.

Comprehensive EPCs are more than just financing mechanisms. They are programmes of practical engineered energy efficiency measures that are implemented in buildings to deliver real energy savings through heating, ventilation, air conditioning, lighting, peak load management, thermal insulation, controls and building fabric improvements.

The programmes may also include retraining of staff on modern efficient operating methods, or direct operation by the ESCO. The intention is to keep the total energy consumption to a minimum – by way of demand side energy efficiency methods.

The key benefits of comprehensive EPCs to the customer include:

- Avoided capital expenditure – by transferring this role to the ESCO or a financier.
- Energy and cost savings are delivered quickly and for the long term – although there is a relatively long procurement lead time, once an EPC is in place the ESCO can generally deliver savings more quickly and efficiently than a piecemeal approach of procuring individual energy projects. The ESCO can guarantee savings will be sustained over the long term.
- Risk transfer – the risk of achieving savings and the credit risk are generally transferred from the customer to the ESCO and financier.
- Modernisation of a building’s energy infrastructure – the ESCO will make investments that reduce energy use, but may also improve reliability, reduce maintenance costs, improve comfort and upgrade plant and equipment that has reached end of life. Staff training may also be included.
- Reduced management time – management can focus on the desired outcomes (energy and cost savings), without having to manage how they are achieved. Freed of the need to understand and approve energy saving predictions and designs, management time can be focussed on core business.

**EPC in a Nutshell**

An important principle of energy performance contracting is that energy efficiency investments are paid for over time by the value of energy savings achieved.

**Key elements of any energy performance contract are:**

- The ESCO undertakes to improve the energy efficiency of the facility.
- The contract is structured so that the compensation is contingent on demonstrated performance, i.e. *the ESCO takes a risk*.
- There is an agreed method for measuring and verifying energy savings.

An EPC arrangement may involve the energy efficiency investment being financed by either the ESCO or a third party financier.
When evaluating the suitability of a project, or group of energy saving opportunities, for energy performance contracting there are four key considerations, as illustrated below.

The first and core consideration is that the project has to be **viable** in its own right: in order to justify anybody spending capital on implementing an energy saving project, the savings generally have to be sufficient to recover the original capital cost and investment return over a number of years (3 to 20 years). If the energy savings (and any maintenance savings) are insufficient, then the customer may have to fund a portion of the works as a “cost of ownership”. Furthermore, the project must be of sufficient scale to justify the transaction cost and attract finance.

If the project is viable, then one must consider how the capital will be supplied to finance the works, how the savings will be distributed and how the various risks will be allocated. Traditionally these are all borne by the customer, but an EPC allocates them to the customer, the ESCO and the financier.

The capital can be supplied out of the customer's own funds, by the ESCO, or by a third party (e.g. a public capital fund, a private capital fund, an energy utility, a bank). The overall capital is likely to be financed from a number of sources. If capital is supplied by an ESCO or third party, then a multi-year contract is required so they can recover their investment with interest. The associated contract options are discussed further in the next section. The cost of this capital is critical, and this depends largely on the risks, discussed below.

The next consideration is **risk**. As already discussed, there is a risk that equipment will not perform as was expected, or projected savings will not materialise because the underlying assumptions in predicting savings were incorrect. This risk is typically borne by the ESCO, this being their area of expertise and value added. The risk may be borne entirely by the ESCO, such as when the ESCO guarantees the savings, or in part, such as when the savings are shared.

There is also the credit risk, i.e. the risk that the customer can’t, or won’t, pay at some point in the future. This will be assessed by the ESCO or the third party financier and will affect the cost of capital.

Finally, there is the energy price risk. If energy prices change, so does the value of the savings. As the customer is already inherently exposed to fluctuations in energy prices and has most to gain if energy prices fall, this risk is typically borne by the customer. This can be done by agreeing a fixed energy price, or an energy price floor, at which savings are valued.

The fourth consideration is **savings**. Not just the value of savings, but also how those savings are allocated amongst the different parties. Generally the higher the savings, and the greater the proportion of savings that are allocated to the ESCO or financier, the shorter the contract term.

Typically the contract life is determined by the length of time needed for the savings to repay all the costs of the project (capital, project management, financing costs, etc). It may be extended if the customer wishes the repayment terms to be lower by spreading them over a longer period of time; or where the client wishes the ESCO to guarantee the savings for a longer period of time. There is usually a premium for this.

The capital cost of a project, the annual cost savings it will deliver and the number of years for which savings accrue (project life) will determine the size of the overall project return (i.e. its viability, or Internal Rate of Return). How this return is distributed is determined by who supplies the capital, and how the risks and savings are allocated.
Different ESCO models (as defined in different forms of contract) and contract clauses allocate these risks – and the rewards – between the different parties.

As mentioned, the ESCO, the customer organisation, or a third party (e.g. public fund, private capital fund, energy utility or bank) may provide the capital. One of the principal benefits of EPCs is that it provides a mechanism for the customer organisation to save now and pay later out of the savings achieved. This future cash flow, arising from a capital investment in energy savings, provides a means of capital repayment that may be satisfactory to a financier.

If Third Party Financing is used, the financier may supply the capital directly to the ESCO or to the customer, resulting in a range of contract permutations. To bring clarity to the discussion, Energy Performance Contracts are most easily initiated by beginning with some form of contract model or framework which can be customized for the specific project.

Three EPC business contract models are discussed here:

- **Shared savings.**
- **Guaranteed savings.**
- **Variable contract term.**

We discuss each below assuming a financier is involved. If the financing is provided by an ESCO or the customer organisation, then this simplifies the contractual arrangements considerably. There are a number of short case studies from page 10 onwards which the reader may find helpful to refer to.

In a typical Shared Savings Contract the ESCO provides the capital (perhaps out of its own funds, or it may take out a loan from a third party financier to cover the cost of the investments in energy savings). Once completed, the customer has lower energy costs and will share an agreed portion of these savings with the ESCO over the term of the contract. The ESCO uses these savings to repay the loan from the financier. Typically the term of the contract and the loan will match, and the ESCO’s share of the savings will exceed the loan repayment costs. Importantly, the financier is taking the risk that the ESCO may be unable to repay the loan; if the ESCO is a small or medium enterprise, the cost of credit may be quite high. In some cases the energy savings may be valued based on prevailing energy prices, which means the ESCO also takes the energy price risk. These considerations generally mean the ESCO is a large enterprise with strong balance sheet and access to capital markets.

Although this contract arrangement can specify that the ESCO will guarantee, rather than share, the savings, the ESCO is likely to prefer to share the savings. From the ESCO’s perspective, sharing savings incentivises the customer to minimise energy use and reduces the ESCO’s energy performance risk. As the ESCO is relieving the customer of the need to provide finance, the ESCO is likely to be able to dictate the use of shared savings.

The ESCO typically retains ownership of the asset.
Guaranteed Savings Contract

In a typical Guaranteed Savings Contract the customer takes out a loan from a financier to finance the investments in energy savings. The customer contracts with the ESCO to implement the energy savings works. The ESCO assumes performance risk by guaranteeing energy savings. The customer pays the ESCO for these works on acceptance of the installation, possibly withholding a portion until savings have been verified. The customer may also pay the ESCO an ongoing fee to verify savings annually or maintain the equipment. If the savings are insufficient, the ESCO pays the difference between what was achieved and what was guaranteed. The savings are valued based on a fixed energy price agreed at the outset. This contract type means the ESCO takes the performance risk, the customer takes the energy price risk, and the financier takes the credit risk.

As the customer is arranging financing based on the value of energy savings, the customer is generally anxious that the ESCO guarantees energy savings. In this case the customer is not relying on the ESCO for capital and is likely to be able to dictate that the ESCO will guarantee savings. As the ESCO does not need access to capital, or a credit rating, smaller ESCOs can participate. This arrangement is well-suited to public sector organisations where the financier may be a public investment fund.

Although the ESCO does not provide the capital, the ESCO is likely to have an established relationship with the financier and to be able to bring the financier to the table. The ESCO’s reputation in delivering on its guarantee is an important consideration. A performance bond may also be used.

Variable Contract Term

Variable Contract Term is similar to a Shared Savings Contract, except it reduces the risk to the ESCO if the quantity or value of savings is less than expected.

In the example illustrated, a customer signs an EPC with an ESCO whereby the ESCO receives 90% of the verified energy savings each year until the ESCO has been paid its original capital investment plus an agreed rate of return. Once the ESCO has received full payment, the contract ends (early payout) and the future savings are kept by the owner. Normally a maximum contract term would be agreed, at which point the contract would end even if the ESCO has not received full payment, and all future savings are kept by the owner.

A variation on this arrangement is called ‘First Out’, in which case the ESCO receives 100% of the energy verified savings each year until the ESCO has received its original capital plus agreed rate of return. At that point the contract ends and the owner receives all savings. The advantage of this arrangement is it reduces the amount of time the customer and ESCO are bound together.

The Variable Contract Term arrangement is appealing as it is very transparent, and the ESCOs Internal Rate of Return (IRR) is agreed up front. In the event that the customer’s circumstances change and the customer wishes to buy out the ESCO, the value of the contract can be calculated thereby allowing an early termination.

In the above example, a financier rather than the ESCO, may provide the capital and receive the repayments. However, the ESCO is likely to remain guarantor of the energy savings.
Savings, of course, are a measure of avoided energy use and cannot be measured directly. They are established by comparing measured energy use before and after implementation of energy conservation measures with adjustments for changes in weather, occupancy, opening hours, production, etc.

Records of energy use before any changes are made, or Baseline Energy use, are invaluable. Consideration should be given to gathering Baseline energy records at the Measurement Boundary (discussed below) for this purpose very early in the process.

When planning to measure and verify savings, a fundamental consideration is the Measurement Boundary, i.e. savings may be determined from measuring an entire facility, or just a portion of it. The Measurement Boundary should be selected so that the savings will be high enough to be confidently discriminated from the Baseline Energy data.

The other fundamental consideration is how energy use will be measured to establish savings. In some cases, taking a measurement of instantaneous electrical (or gas or heat) load before and after may be sufficient. In most cases logging of energy use at regular intervals over a representative timeframe will be required. In cases where there is no historical baseline data, a calibrated simulation may be undertaken; however, this requires time and skill to do accurately.

To establish the impact of an energy conservation measure on energy use, a set of rules must be agreed at the outset to measure and verify savings. This is called a Measurement and Verification Plan and includes the records of Baseline Energy, the Measurement Boundary, the method of measurement, how adjustments will be made to take account of changes in weather, etc., and how savings will be calculated.

The above concepts are generally based on an established protocol, such as the International Performance Measurement and Verification Protocol (IPMVP). Certified Measurement and Verification Professionals can provide guidance. A list of certified professionals is available at www.evo-world.org/CMVPs.

Fig. 8 Measuring and Verifying Energy Savings as a Result of an Energy Performance Contract
Case Studies

Case Study of Energy Management with Performance-Based Payment

**Customer**
Port of Cork.

**ESCO**
Longship.

**Measures**
The ESCO undertook lighting, heating and insulation upgrades to buildings, water saving projects and specific works to dockside cargo handling equipment such as straddle carriers and mobile cranes which are used to move containers around the facility. Local energy metering is also being installed.

**Contract**
The project was financed and is owned by the customer (with grant assistance from SEAI). There is a gain share agreement between the customer and the ESCO, whereby if actual savings are 4-6% of overall energy use, then the ESCO will be paid their fees in full. If savings are less than 4%, then the customer may claw back a percentage of the fees paid to the ESCO. If savings are greater than 6%, the ESCO will be paid bonus. Savings will be monitored and the final fee paid at the end of 2012.

**Benefits**
The ESCO is motivated to remain involved until energy savings meet or exceed projections.

**Investment**
€270,000.

**Savings**
It was calculated that these projects would result in a 5% overall reduction in energy use by the Port in 2012 relative to 2011. This will kick start the Port of Cork’s journey to implementing the ISO50001 energy management standard and achieving their target of a 33% energy efficiency improvement by 2020.
Customer
44 poultry broiler sheds across 22 sites in six counties.

ESCO
Candelas Ltd.

Measures
Lighting only retrofit involving the removal of existing incandescent lighting and replacing it with dimmable fluorescent T5 corrosion proof fittings, including dimming systems and waterproof distribution boards. The lights were hung using a catenary wire suspension system, and wired using seven-core cable for maximum dimming flexibility.

Contract
The ESCO assembled a group of farmers, and applied for co-funding from SEAI. The ESCO guaranteed energy savings of 65% (typical, depending on each farm’s existing installation) based on a direct reduction in lighting load. Further savings associated with the use of dimming were not included in the guarantee due to the added complexity of verifying savings.

Cost meters also installed on lighting circuits and farmers trained in their use.

The farmers paid 50% to the ESCO up front, and 50% on installation and verification of energy savings.

The reduction in lighting load was verified by measuring the power drawn by the lighting circuits before and after the installation. Lux levels were also measured before and after to demonstrate light levels were the same or better. The ESCO’s guarantee is that if the energy savings are less than those guaranteed, the ESCO refunds the difference between actual and guaranteed savings.

The SEAI grant, once received by the ESCO, was returned to the farmers as a rebate.

Benefits
The ESCO assembled a group of farmers with a common need to create a viable project of sufficient scale to justify its management time. The farmers’ risk was reduced by the performance guarantee. The new lights have a longer life, and associated lower maintenance costs. The dimming feature has saved energy and improved light management; anecdotal evidence suggests bird weights, mortality rates and bedding costs have improved (currently the subject of further research).

Investment
€200,000.

Savings
€75,000 / 538,000kWh.
Case study of Energy Performance Contract with Shared Savings

**Customer**
Royal Victoria Eye and Ear Hospital.

**ESCO**
ARAMARK.

**Measures**
The ESCO carried out an investment grade audit and assessed the feasibility of upgrading equipment in the hospital to provide energy savings. The equipment was selected, installed and commissioned including a 70KWe combined heat and power plant, building management system, efficient lighting, insulation and a remote energy monitoring system.

**Contract**
The project was financed by the ESCO and the customer (with grant assistance from SEAI). The customer receives a quarterly report and invoice detailing the savings. The costs on the invoice are fully financed by the savings in the utility bills. This is a shared savings agreement over 10 years with future savings going directly to the hospital. There is an incentive for both the customer and the ESCO to work together to achieve additional savings.

A full structured ongoing energy management service is provided as part of the contract including staff awareness campaign and routine audits, outlining further opportunities for savings. There is also remote measuring of plant performance, energy usage and optimisation of plant control based on continuous tariff analysis. Measurement and verification of savings is being conducted independently by an obligated party.

**Benefits**
This project resulted in guaranteed electrical and fuel savings for the client combined with improved comfort conditions for both staff and patients. All operational and maintenance risks are the responsibility of the contractor.

**Investment**
€300,000 – financed by the ESCO and the customer (with grant assistance from SEAI).

**Savings**
Circa €60,000 per annum.
Case Study of Integrated Energy Contract with Shared Savings

Customer
Stewarts Hospital.

ESCO
Dalkia.

Measures
Fuel conversion from oil to gas. New energy centre and district heating system incorporating 2no. 1 tonne steam boilers, 700kW heating boiler, and 140kWe CHP. New main distribution board and emergency generator. Controls to optimise the boilers and provide 55no. heating zones. Energy monitoring system. Energy efficient lighting. Second 140kWe CHP at leisure centre.

Contract
The project was financed and is owned by the ESCO (with grant assistance from SEAI). ESCO invoices monthly to cover cost of energy supply, financing, operation, maintenance and energy management, replacement guarantee on failure. Shared savings agreement. Lower energy costs help offset financing costs. 15 years.

Benefits

Investment
€1.5 million, financed by Dalkia (with grant assistance from SEAI).

Savings
Circa €100,000 per annum.
**Comprehensive Refurbishment**

Generally EPCs are used to implement energy conservation measures for building technologies such as heating, ventilation, air conditioning/cooling systems which often have payback periods of up to 10 years. In most cases a building envelope refurbishment (or refurbishment of plant with low energy consumption) is excluded due to the much longer payback of these measures. This results in a large portion of the overall energy saving potential being neglected during refurbishment and lost until the next comprehensive refurbishment cycle of the building, more than 30 years later.

It is worth noting that this still provides the main benefits of EPC: transfer of technical performance risk using a turnkey solution with guaranteed energy (and maintenance) savings, and those savings used to (in this case partially) cover the investment cost. The additional funding provided by the customer simply faces up to the reality that energy efficiency cannot finance everything.

The scope of an EPC can be extended to incorporate fabric-related measures by:

- Bundling projects with different payback periods into a single energy performance contract.
- Securing a grant.
- Incorporating maintenance budgets where the refurbishment has maintenance and energy benefits, e.g. flat roof insulation combined with roofing material renewal.
- Providing additional funding as a cost of ownership associated with non-financial benefits, e.g. improved building appearance, improved occupant comfort, health and safety requirements, end of life, risk of failure.
- Extending the EPC term to 20+ years.
- Agreeing to pay the ESCO/financier a residual value at the end of the contract.
Public Sector Considerations

Drivers
The National Energy Efficiency Action Plan provides a vision for 2020 that "the public sector will improve its energy efficiency by 33% and will be seen to lead by example – showing all sectors what is possible through strong, committed action". As part of its plan to reach this goal, and in line with the EU Energy Services Directive, SEAI is promoting the use of Energy Performance Contracts (EPCs) in the public sector, particularly EPCs that involve the deployment of private sector capital to finance investments in energy efficiency. In essence, SEAI is encouraging the development of a market where the private sector makes investments in energy efficiency, with the energy savings being used to repay those investments over time.

Avoid Skimming The Cream
Despite discussion about project viability, it is important to remember the public sector goal of a 33% reduction in energy use by 2020. Achieving the public sector goal usually requires 'deep retrofit', i.e. implementing projects with long paybacks (exceeding 10 years). When assessing a menu of energy saving opportunities, it is tempting to implement those with the shortest payback first ('skimming the cream'). However, doing so makes it difficult to finance subsequent projects with longer paybacks that may be needed to reach the 33% saving target. Consideration should be given to bundling a number of opportunities of varying investment attractiveness into a single project.

Balance Sheet Considerations
Whoever receives the finance effectively carries this liability on their balance sheet. Balance sheets show an organisation's assets and liabilities. If an organisation is perceived to have borrowed money to purchase an asset (in this case energy efficiency equipment), then the asset and the loan (liability) are shown on either side of the organisation's balance sheet. For some organisations, particularly those in the public sector, whether or not the financing cost is on that organisation's balance sheet is an important consideration.

To address this, ESCOs and financiers may propose the following EPC arrangement with public sector organisations:
- The ESCO agrees to design and build the project, and then transfer the assets to the customer for a nominal fee (e.g. €1). This gives the customer asset ownership, which is generally regarded as essential by public bodies.
- The customer agrees to pay the ESCO a monthly service fee for the savings achieved plus, where appropriate, any operation and/or maintenance fees.
- The ESCO guarantees the savings. If savings do not reach the agreed level, the ESCO must reimburse the customer for the additional energy cost incurred by the customer.
- The financier agrees to provide the finance to the ESCO, using the cash-flow arising from the ESCO-Customer agreement as collateral. Note that whilst a financier might normally seek collateral in the form of the asset title, in this case the assets are scattered and of limited resale value once installed.

Whether or not the energy efficiency investment is perceived as a being financed by a loan depends upon how the deal is structured to take account of accountancy standards, organisation practices and in the case of the public sector, EU (Eurostat) rules.

The EPC Development Process
Developing a comprehensive Energy Performance Contract is a multi-stage process, outlined below. From a public procurement standpoint, it is critical to bear in mind that the ESCO provides an energy efficiency service, not a product. Care should be taken at the outset – before significant human or financial resources have been committed – to ensure that your organisation is suited to this type of long term contract model, and that an ESCO is likely to be interested in what you have to offer.

The chart below shows a process for developing a comprehensive EPC, particularly in the public sector. However the ESCO may be engaged at an early stage, depending upon: the owner’s ability to absorb preliminary costs, the services needed by the owner, the risk allocation strategy, the terms of the contract, and the procurement constraints of the organisation.

1 More information is available at http://www.seai.ie/Your_Business/Public_Sector/Funding_Finance_Procurement/
Fig. 9 EPC Development Process

No ESCO Involved

Get Commitment
Objectives?
Identify your organisation’s financial and energy objectives.
Is EPC a solution?
Consider appetite for risk, access to capital, energy expertise.
Will EPC work?
Consider organisation structures and culture; type of buildings and potential for savings.
Begin gathering Baseline energy records.

Get Organised
Establish a strategic group and sponsor.
Identify a project manager and project management group.
Agree process and timeframe.
Identify and agree financial and human resource commitments, allocate budget.

Preliminaries
Basic energy survey to quantify energy use and likely savings.
Define likely scope of contract – facilities, services, O&M, contract duration.
Select preferred contract model and sources of finance.
Risk evaluation and value for money assessment.

ESCO Tender
Appoint legal advisors.
Select procurement process. Typically competitive dialogue or negotiated procedure.
Prepare and issue procurement documentation.
Bid evaluation and interviews.

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Decision Point
Are energy supply/services companies for your organisation?

Decision Point
Scope suitable for EPC? Project viable?

Decision Point
If you proceed and withdraw later, you are likely to incur fees. Proceed?

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3-6 Months

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6 Months
Get Organised
- Establish a strategic group and sponsor.
- Identify a project manager and project management group.
- Agree process and timeframe.
- Identify and agree financial and human resource commitments, allocate budget.

Get Commitment
- Identify your organisation’s financial and energy objectives.
- Is EPC a solution? Consider appetite for risk, access to capital, energy expertise.
- Will EPC work? Consider organisation structures and culture; type of buildings and potential for savings.

Preliminaries
- Basic energy survey to quantify energy use and likely savings.
- Define likely scope of contract – facilities, services, O&M, contract duration.
- Select preferred contract model and sources of finance.
- Risk evaluation and value for money assessment.

ESCO Tender
- Appoint legal advisors.
- Select procurement process. Typically competitive dialogue or negotiated procedure.
- Prepare and issue procurement documentation.
- Bid evaluation and interviews.

Detailed Analysis and Negotiation

Implementation
- Planning and design, installation and commissioning, project management, Insurance.

Savings and Performance
- Energy savings achieved. Monitor and verify results. Operation and maintenance. Financier pays ESCO for works (guaranteed savings contract). Ongoing fee payments to financier and/or ESCO.

Contract Ends
- Savings accrue solely to your organisation.

Secure and Draw Down Project Financing

ESCO/Energy Supply Company Involved
No ESCO Involved

Decision Point
- Are energy supply/services companies for your organisation?

Decision Point
- Scope suitable for EPC? Project viable?

Decision Point
- If you proceed and withdraw later, you are likely to incur fees. Proceed?

Decision Point
- Final decision. Proceed?

3-6 Months 6 Months 6-12 Months 5-20 Years Rest of Equipment Life
Contractual Considerations

Authority to Purchase
A public authority should confirm at the outset that it has the necessary authority to enter into any project. The State Authorities (Public Private Partnership Arrangements) Act 2002 may be of relevance.

Procurement Framework
The ESCO will need to be procured in compliance with national and European public procurement law and rules on state aid. The Competitive Dialogue process may be appropriate for complex EPCs, but involves a number of steps. Where prior overall pricing is not possible or if no acceptable tenders are submitted, the Negotiated Procedure may provide an alternative.

Corporate Structure of Contracting Parties
If a tenderer is a consortium, a prime contractor model could be used or consortium members could execute the contract documents on a joint and several liability basis. In the case of a project involving multiple public authorities, the public authorities can enter into the relevant contracts on their own behalf or, alternatively, can create a Special Purpose Vehicle (SPV, i.e. a company specifically incorporated for this purpose) for the purpose of the project which will enter into the contracts. This approach would generally not be necessary if there is a single public authority.

Contractual Structure
The Contract Documents may be based upon a suite of different contracts for different stages/parts of the project.

For instance:
• The FIDIC Conditions of Contract for EPC/Turnkey Projects (1st Edition 1999) are an industry standard form of contract which the industry is familiar with and which provide for appropriate risk transfer for engineer, procure and construct projects.
• The separate HPAs for each public authority provide each public authority with a greater level of autonomy in managing (and paying for) the ultimate deliverable and managing their relationship with the ESCO in such respect, whilst also simplifying the relationship between the public authorities by making them less interdependent operationally, as well as with the ESCO, in relation to the project once the construction phase has been completed.

The Facility
Public authorities need to consider in whom ownership of the project facility should reside, i.e. in the ESCO or the public authority (or, if there are a number of public authorities, in some or all of the public authorities). There are a variety of factors which merit consideration in determining when ownership should pass.

The requirements for hand back of the facility (i.e. the condition in which it must be handed back) at the end of the project term (whether this is the term of the ESCO ownership or the term of the ESCO supporting and maintaining the facility) will also need to be considered.

These include, in no particular order:
• the implications for third party financing;
• landlord and tenant issues;
• the structure and conditions of any relevant grants;
• tax/VAT implications;
• desired level of control over the facility;
• liability issues;
• ESCO insolvency risks;
• how to manage any anticipated expansion of the facility to supply third parties;
• insurance obligations;
• implications for energy targets/credits;
• balance sheet implications; and
• the level of risk transfer.
Energy Services Company (ESCO)  
There are a variety of descriptions of what an ESCO is, provided below, but the EU Energy Services Directive offers a definition which is often cited for this reason. A company may be, or identify itself as, an ESCO, without necessarily entering into Energy Performance Contracts. Or a company may be an ESCO that enters into EPCs, and may also offer other services, such as Energy Surveys.

Traditionally an Energy Services Company was associated with energy efficiency initiatives, with an Energy Supply Company being associated with heat, or heat and electricity, supply contracts. However, this distinction, may no longer be relevant as many companies offer both energy supply and energy efficiency services.

EU Energy Services Directive and NEAP  
An ESCO is a natural or legal person that delivers energy services and/or other energy efficiency improvement measures in a user’s facility or premises, and accepts some degree of financial risk in so doing. The payment for the services delivered is based (either wholly or in part) on the achievement of energy efficiency improvements and on the meeting of the other agreed upon performance criteria.

ESCOs around the World (1995 ed.)  
An ESCO guarantees its energy savings performance. Parallel organisations, such as energy service providers, may offer the same service, but do not offer the guaranteed results.

Energy Performance Contract (EPC)  
There are a variety of descriptions of what an EPC is, provided below, but the EU Energy Services Directive offers a definition which is often cited for this reason. The important thing, however, is to understand the concept rather than cling to a definition. In is worth noting, in particular, that an EPC is concerned with energy efficiency, and measures its performance by quantified energy savings. This distinguishes from an Energy Supply Contract (ESC), which delivers energy for an agreed fee.

EU Energy Services Directive and Irish SI 542  
An EPC is a contractual arrangement between the beneficiary and the provider (normally an energy services company) of an energy efficient improvement measure, where investments in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement.

EU ESCO Association  
EPC is a long term contractual agreement where the customer benefits from new or upgraded energy equipment and the ESCO’s remuneration is directly tied to the savings achieved by the reduced energy consumption. The cost of investment is paid back from the savings, and in case the ESCO fails to achieve that, they must cover the difference between the actual and the guaranteed costs.

Australasian Energy Performance Contracting Association  
EPC is when an energy services company is engaged to improve the energy efficiency of a facility, with the guaranteed energy savings paying for the capital investment required to implement the improvements… EPC allows facility owners and managers to upgrade ageing and inefficient assets while recovering capital required for the upgrade directly from the energy savings agreed by the ESCO.

Institute for Building Efficiency (Johnson Controls)  
An EPC contains the following elements:

- EPC improves building energy efficiency;
- EPC reduces operating costs;
- upfront investments for EPC are recuperated over time through cost savings; and
- structured project financing (optional) can eliminate need for upfront investment by the owner, while allowing the ESCO to fund construction works and recognise revenue in a timely fashion.
Third Party Financing (TPF)
An agency, other than the customer or the ESCO, that provides the initial capital to fund the energy efficiency investments. For instance, the financier may be a private individual, a private equity investment agency such as a venture capital fund or an institutional investment fund, the financing division of a large company, a government investment fund, a utility, a bank or other lending agency. The financier may view the capital being supplied as equity, debt, a lease, etc. The financier may supply the finance to either the ESCO or the customer.

Measurement and Verification
The International Performance Measurement and Verification Protocol (IPMVP), developed by the Efficiency Valuation Organisation, is an internationally referenced framework that is used to ‘measure’ energy or water savings. The EVO definition of measurement and verification is provided below.

Measurement and Verification (M&V) is the process of using measurement to reliably determine actual saving created within an individual facility by an energy management program. Savings cannot be directly measured, since the represent the absence of energy use. Instead, savings are determined by comparing measured use before and after implementation of a project, making appropriate adjustments for changes in conditions.

Approved by the Irish Government and the European Union


ESCOs Around the World: Lessons Learned in 49 Countries, S. Hansen et al., 2009.


Holistic Optimisation Leading to Integration of Sustainable Technologies in Communities, Deliverable #10 Dundalk District Heating, DG TREN/06/FP6/ENV5/05070918/038344, 2011.

Building Energy Retrofit Program, Building Owners and Managers Association International and the Clinton Climate Initiative.

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