Breaking down Barriers to Performance Contracting in Building Energy Retrofits

Existing buildings are responsible for 40% of the world’s total energy consumption and account for 24% of the world’s carbon dioxide (CO₂) emissions.¹

Brand-new and certified eco-friendly properties often get lauded. But what is overlooked is that existing buildings – and they represent the huge majority – continue to operate inefficiently and most are not due to be demolished or rebuilt in the near future. To make tangible inroads in energy conservation, existing buildings need to undergo energy-efficient retrofits in order to reduce their environmental impacts.

Building energy retrofits make sense because while the main building structure is designed to withstand occupancy use for say 60 years, the energy-consuming equipment within it has considerably shorter life span. For example, the HVAC or air-conditioning system could become inefficient after 15 – 20 years and would need replacing through a retrofit.

Often, such upgrades for efficiency and the lowering of building energy consumption are best carried out on a comprehensive basis. Non-energy goals and benefits, such as space optimisation and expansion, increased access or occupancy comfort, improved external appearance, are important to building owners to implement at the same time, especially when the measures act in concert to lift the building market value or rental income.

For building owners and organisations, there is a strong business case for undertaking building energy retrofits. Still, these can be difficult to implement effectively.

In a building energy retrofit aimed at making efficiency improvements, the basic idea is that following an initial investment to implement energy conservation measures, the building would then be able to operate at a lower cost. Over time, the cumulative energy cost savings eventually account for the initial cost of the retrofit project.

While the basic concept of a retrofit is nothing new, many owners are unfamiliar with the idea of making investments where the return comes in the form of energy cost savings. Hence, a frequent barrier is lack of sufficient knowledge and education is important to address this gap.
Energy Performance Contracting: An Enabler for Energy Efficiency

Another obstacle that owners face is the matter of high upfront costs in the initial investment required. Fortunately, financing mechanisms are available and Energy Performance Contracting or EPC is firmly established as one such innovative tool.

EPCs are designed so that there is reduced or no upfront cost to the building owner with funding provided by a bank or financial institution, or from government grants, loans or financial schemes.

What is Energy Performance Contracting?
An Energy Performance Contract (EPC) is an innovative financing technique that repays the cost of energy efficiency projects through the cost savings they produce.

What is the Advantage?
Energy Performance Contracting gives building owners access to outside capital for efficiency projects by transferring risk to the Energy Services Company (ESCO) which is also the party with the technical capability and capacity to provide the building retrofit and who would take complete “turn-key” responsibility for the project by covering aspects of the project from start to finish: preliminary energy audits, detailed design and engineering, business case analysis, installation, commissioning, and performance measurement and verification, ongoing maintenance.

More importantly, the ESCO assumes performance risk for the project in the form of a long-term financial guarantee to ensure that the projected energy and operational cost savings materialise and are sustained over time.

The assumption of risk by the ESCO together with the provision of the guarantee opens up financing options and supplies capital that otherwise would not be available through third party financing company such as a bank.

Distinguishing Features of an EPC
In a typical EPC, the building owner contracts with an Energy Service Company (ESCO) to install the energy improvements and guarantee the energy savings over the contract term. The ESCO is typically responsible for designing, implementing, and measuring the results of an EPC project.

The standard elements that distinguish an EPC are:

- **Turnkey Service**: The ESCO provides all of the services required to design and implement a comprehensive project at the customer facility, from the initial energy audit through long-term monitoring and verification of project savings.
- **Comprehensive Measures**: The ESCO tailors a comprehensive set of measures to fit the needs of a particular facility, and can include energy efficiency, distributed generation, water conservation and sustainable materials and operations.
- **Project Financing**: The ESCO arranges for long-term project financing that is provided by a third-party financing company.
- **Project Savings Guarantee**: The ESCO provides a guarantee that the savings produced by the project will be sufficient to cover the cost of project financing for the life of the project.

The following figure depicts Energy Performance Contracting at a glance:
The Way Ahead

EPC is internationally recognised as a guaranteed cost-effective financing method to reduce environmental impacts and operating costs of buildings. In many markets, EPC is also regarded as a very effective strategy to stimulate economic growth while conserving scarce resources.

The use of EPC has been most developed in the US market where EPC has been implemented in large number of retrofits of public sector buildings, hospitals, schools and universities. From 2008, energy price spikes also led to the renewal of interest in EPC by the private-sector building market.

Compared to the US, the European Union (EU) market is described as undeveloped but growing market for EPC. Germany is already a pioneer in developing the EPC market where several large well-known ESCOs, such as Siemens, operate. The other EU countries have been taking actions to facilitate the growth of their own EPC markets. Given the continued financial challenges in Europe, the cash-strapped public sector is a very favourable customer group to accelerate the development of new innovative EPC models and structures.

In China, the EPC mechanism was first introduced in the 1990s as a way to lessen the country’s energy burden. Although implemented in various energy efficiency improvement projects, it has yet to be used in a substantial way in existing-building retrofit projects. One barrier in China is the lack of a culture of mutual trust between building owners and ESCOs. For example, owners are averse to the notion of multi-year service contracts with ESCOs, while ESCOs worry about owners’ ability to manage the building operations profitably for the long term.ii

Singapore has a target for the greening of 80% of total building stock by 2030. The public sector has been leading in the use of EPCs for building energy retrofits. Typically, under the Guaranteed Energy Savings Performance (GESP) contract developed for Singapore’s EPC market, an ESCO provides to the public agency a guarantee of energy performance over a contract period of 3-5 years.iii

To further facilitate existing building owners in the private sector, the Building Retrofit Energy Efficiency Financing (BREEF) Scheme provides financial assistance to building owners under EPC partnerships with ESCOs to attain BCA’s Green Mark standards. For commercial office and retail buildings, the typical payback period is 5-7 years to recovering energy cost savings is 5 to 7 years. A recent article “BCA Green Mark and Building Retrofit” showcased successful building energy retrofits in Singapore.iv

http://www.johnsoncontrols.com/content/dam/WWW/jci/be/solutions_for_your/private_sector/Financing_PrivateSector_whitepaper_FINAL.pdf

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i IEA, 2006
ii Barriers into implementing EPC mechanism into Hotel Buiding Retrofits in China
http://www.misbe2011.nl/mobview/presentation/899
iii Guaranteed Energy Savings Performance (GESP) Contracts
http://app.e2singapore.gov.sg/Programmes/Public_Sector_Taking_the_Lead_in_Environmental_Sustainability.aspx
iv BCA Green Mark and Building Retrofit