

INDUSTRY OVERVIEW

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REPORT COMMISSIONED FROM IPSOS

We have commissioned Ipsos, an independent market research and consulting company, to conduct an analysis of, and to report on, the energy saving and management solution industry for lighting projects both globally and in Australia, China, Hong Kong and Japan for the period from 2009 to 2018. The report prepared by Ipsos is independent from our influence. Ipsos received a total commission of HK\$488,000 for the research and preparation of the Ipsos Report. The payment of such amount was not conditional on our successful [REDACTED] or on the results of the Ipsos Report.

Founded in Paris, France, in 1975 and publicly-listed on the NYSE Euronext Paris in 1999, Ipsos SA acquired Synovate Ltd. in October 2011. After the combination, Ipsos becomes the third largest research company in the world. Ipsos employs approximately 16,000 personnel worldwide across 85 countries. Ipsos conducts research on market profiles, market size and market share and performs segmentation analyses, distribution and value analyses, competitor tracking and corporate intelligence.

The Ipsos Report includes information on the energy saving and management solution industry for lighting projects such as, among others, global market demand and supply, market demand and supply in Hong Kong, the PRC, Japan or Australia, and the competitive analysis of the industry, which have been quoted in this [REDACTED]. The information contained in the Ipsos Report is derived by means of data and intelligence gathering which include: (i) desk research; (ii) client consultation; and (iii) primary research by interviewing key stakeholders and industry experts, key players and competitors. According to Ipsos, this methodology guaranteed a full circle/multi-level information sourcing process, where information gathered was able to be cross-referenced to ensure accuracy. The intelligence gathered by Ipsos was analysed, assessed and validated using their in-house analysis models and techniques.

Our Directors confirm that after taking reasonable care, as at the date of this [REDACTED], there has been no material adverse change in the market information since the date of the Ipsos Report.

The analysis in the Ipsos Report is based on the assumptions that there is no external shock such as natural disasters or the wide outbreak of diseases to affect the demand and supply of electricity, electricity tariffs, and energy saving and management related industries including energy efficiency management, contracting and consulting service industry, lighting related energy saving projects and energy savings investment industry.

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The parameters considered in market sizing and forecast model in the Ipsos Report include (i) Hong Kong electricity tariffs from 2009 to 2018; (ii) commercial building stock 2009 to 2015; (iii) Hong Kong Energy End-use Data 2009 to 2012; (iv) the Building Energy Code and the BEEO; and (v) Hong Kong Climate Change Initiatives and Energy Targets.

OVERVIEW OF THE GLOBAL MACRO-ECONOMIC ENVIRONMENT

Electricity consumption globally, in Australia, China, Hong Kong and Japan and its future development

In 2012, electricity consumption accounted for around 18% (compared to 17% in 2009) of the global energy consumption, followed by oil consumption. Lighting made up almost 19% of the global electricity consumption, making it an important component of any energy saving effort. Together with growing global energy consumption, electricity consumption has gone up by 15% in the past 5 years which was mainly driven by emerging economies. The International Energy Agency predicts in its World Energy Outlook 2013 that by 2035 demand for electricity will be almost 70% higher than today, driven by rapid growth in population and income in developing countries and the resulting increase in the number of electrical devices used in homes and commercial buildings, as well as by the growth in electrically driven industrial processes.

Australia – Australia's energy consumption has grown only minimally by 2.3% over the past five years. In the future it is expected that Australia's electricity consumption will continue to stagnate or shrink, as the push towards greater energy efficiency continues.

China – In 2013 China consumed almost a fourth of all electricity produced globally. That is an increase of around 44% since 2009. This growth is a direct result of economic growth and increasing domestic wealth.

Hong Kong – Hong Kong has seen a small reduction in electricity usage in the last five years (-2.2%) which is mainly driven by residential users. Whilst commercial users reduced their consumption by 0.4% between 2012 and 2013, residential users reduced their consumption by 3%. Electricity prices in Hong Kong are still comparatively low and it is therefore expected that electricity tariffs will be gradually raised in the near future.

Japan – Japan's electricity consumption has fluctuated greatly in the last five years. In 2011 the Fukushima catastrophe reduced the country's nuclear power production by almost 43%. To deal with the supply crisis the government enforced strict restrictions on electricity usage, demanding a reduction of consumption by 15%. Since 2011 electricity consumption has further reduced, which is also the result of rising energy prices. The price for electricity has increased by almost 20% for residential users and by up to 28% for commercial users. Energy efficiency has become an important decision criteria and for example the market share of LED light bulbs has grown from 3% in 2011 to 30% in 2013.

Analysis of current lighting technology

Overall the scales are shifting towards more energy efficient lighting, transforming the existing lighting infrastructure away from classic T12, T8 and T5 fluorescent lighting to solid state lighting or new Tube-in-Tube ("TIT") products. In this context it is important to note that consultation is necessary when choosing the right lighting technology for a commercial application since their suitability greatly depends on the context. For example new TIT technology continues to have a number of advantages over LEDs for the retrofit market with existing fluorescent tube fittings, such as lower purchase price and better suitability for the existing fitting, making it less likely that LEDs is a strong choice for this setting.

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Lighting products in the global market

Currently fluorescent lighting makes up the bulk of the market for lighting products with 50% to 55% market share. This is likely to also decrease in the next years as solid state lighting takes up more market share. Currently solid state lighting contributes only an estimated 12% to 15% to the market, but this is set to 60% to 65% in 2020, becoming the dominant lighting medium in the market. It is clear that driven by increasing efficiency and energy saving light sources will greatly change in the next five years opening up a wide area of opportunities for companies specialising in retrofitting existing lighting or designing new lighting.

OVERVIEW OF ENERGY SAVING AND MANAGEMENT SOLUTION INDUSTRY FOR LIGHTING PROJECTS IN GLOBAL MARKET

Background & development of energy management/performance contracting

ESCOs (Energy Service Companies) have been operational on a large scale since the late 1980s or early 1990s with the beginning of the energy savings business dating back to the energy crisis of the late 1970s, when entrepreneurs worked on ways to combat the rising energy costs. However, with lower energy prices, it became challenging for ESCOs to recover the investment within the desired contract time as payback from savings shrunk.

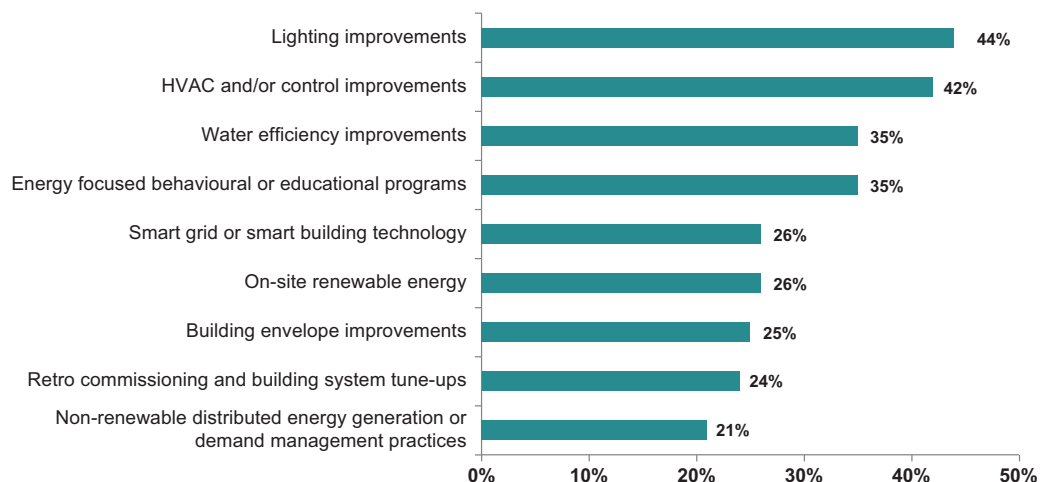
This difficult start lead to an evolution of the ESCO business model, terms, and agreements, changing the character of the industry with the market focus shifting towards guaranteed energy performance. Energy performance contracting (EPC) gained popularity as the "guaranteed savings" model became established. As EPC gained traction as a way to facilitate financing for energy efficiency projects, it strengthened the market in Europe and kick started similar developments in Asia.

The ESCO industry has now spread to different parts of the world but the market development in terms of maturity, government polices/regulations, end user awareness and opportunities is still very heterogeneous. North America and the European Union are more developed ESCO markets with the U.S. being the largest ESCO market in the world. In Asia ESCO operations are growing fast, and the countries with ESCO activities now include China, Japan, Thailand, Singapore, Taiwan, India, Indonesia, Vietnam, Malaysia, the Republic of Korea, and Philippines. The ESCO market is relatively new in Australia and New Zealand.

Electricity saving and management solution projects for lighting projects

According to the "2013 Energy Efficiency Indicator Survey" published by Johnson Controls in 2013, lighting and HVAC are the top two energy efficiency measures being implemented globally.

Relative priority for investment of energy efficiency measures over the next 12 months



Source: 2013 Energy Efficiency Indicator Survey: Global summary, page 22, Johnson Controls

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This is also in line with the "Energy Efficiency Trends Annual Report 2012/2013" published by EEVS. Lighting solutions have been the most commissioned technologies in energy-efficiency projects for developed market. Approximately 25% of the projects commissioned were either high efficiency lighting or controls.

Energy services

ESCOs offer a wide range of services during the whole project cycle. In comparison to other industry player, the services offered by ESCOs are more comprehensive than any other type of market players. While some tasks may be performed in-house, ESCOs also work with other suppliers (such as contractors, equipment manufacturers, governments, financial institutions, consulting engineers, and energy suppliers) defining and implementing the project.

Comparisons of type of services offered by type of industry players

Type of services	ESCOs	Manufacturers	Contractors	Design & Build Firms	Consultants
Energy analysis and audits	✓		✓	✓	✓
Engineering and design	✓		✓	✓	✓
Construction and installation	✓	✓	✓	✓	
Measurement and verification	✓				✓
Commissioning, operation & maintenance	✓	✓	✓	✓	
Financing	✓	✓			
Integrator	✓	✓			

Source: Ipsos Analysis

The following recent case study has been compiled to illustrate the typical nature the energy-efficient lighting projects undertaken by ESCOs:

Case Study: Stikeman Elliott, Toronto, Canada

Year	2011
Technology deployed	Luminaires and fittings <ul style="list-style-type: none"> • Retrofitting 3,100 light fixtures from T12 to T5 tubes and electronic ballasts lighting control
Result	<ul style="list-style-type: none"> • Energy usage was reduced by approximately a half, saving 443,943 kWh/year • Annual cost savings of 36,000 Canadian dollars
Payback time	3.6 years

Source: case study by Race to Reduce Canada

ESCO market supply and demand

The pressing need to improve energy efficiency for a sustainable energy supply is creating a market for energy efficiency products and services worldwide. Growing government commitment and support (e.g. policies and regulations) to foster energy efficiency and management, increasing interest of public and private organisations in energy management, increasing awareness and expansion of the ESCO market worldwide and huge economic potential for energy efficiency have created a new demand and promoted supply of energy efficiency services.

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The table below shows the market size estimates, market potential and ESCO industry status in selected countries namely Japan, Australia, China and Hong Kong.

ESCO Market Assessment (extract): Japan, Australia, China and Hong Kong

Country	Number of ESCOs (2013)	Market Size Estimates (2012/2013)	Market Growth Trend	Market Potential	Key Sectors – Project Implementation /Typical projects
Australia	12	AUD72.6 million (FY2013-2014) – EPCs contract value	Growing	n/a	Mainly public buildings projects (higher education facilities and hospitals in particular). The main technologies/application areas: energy efficient lighting solutions (e.g. LED, efficient T8 fittings, lighting control devices, etc.), HVAC solutions. Co-generation and tri-generation in the commercial and industrial sector
China	1472	US\$8.1 billion (2012)	Growing	US\$14.5 billion	Industry (mainly state owned enterprises) and building projects dominates. The main technologies/application areas: heating and lighting systems, building automation and control systems, waste heat recovery, etc.
Japan	20-30	JPY29.9 billion (2011)	Stagnation	> US\$20 billion (2011 estimates)	Primarily in commercial sector. The main technologies/application areas: heating, lighting, electric equipment, air conditioning, building management systems and energy demand controllers
Hong Kong	20-30	HK\$982 million	Growing	HK\$3.9 billion to HK\$ 6.5 billion (2014 estimates)	Mainly privately owned commercial building, and public buildings. Typical projects include HVAC and lighting retrofit projects

Source: ESCO Market Report for Non-European Countries 2013, JRC Science and Policy Reports 2014, European Commission (note – market size, market potential & no. of ESCOs -page 218, Aus market size -page 102); ESCO Market Report for European Union Countries 2013, JRC Science and Policy Reports 2014, European Commission (note – market size, market potential & no. of ESCOs -page 254, UK-page 172); and Ipsos research and analysis for the Hong Kong market

The demand for ESCOs in Hong Kong is mainly driven by (i) the need to reduce carbon emission; (ii) the growing energy costs; (iii) the government building energy efficiency codes and legislation (including the BEEO and the Building Energy Codes); and (iv) property operations cost management by building owners.

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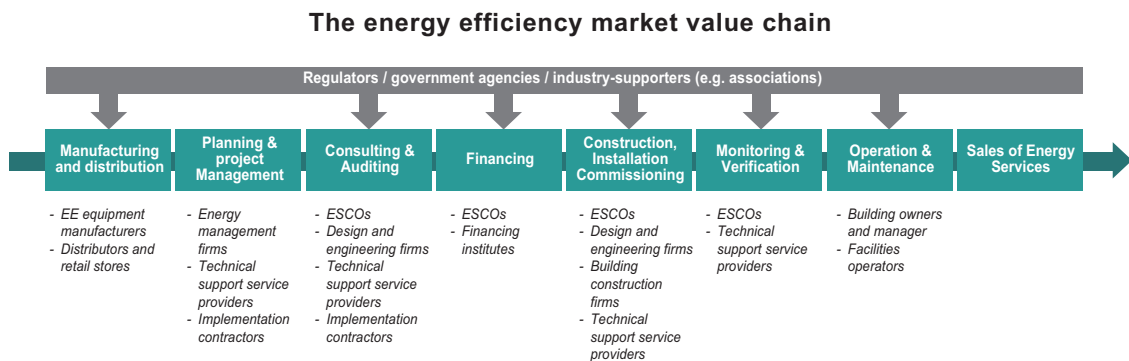
According to the Ipsos Report, it is estimated that Hong Kong's ESCO industry has about 20 to 30 ESCOs serving the market and, based on a representative number of energy saving projects and the average electricity consumption for commercial buildings in Hong Kong, the market size of ESCOs in Hong Kong is estimated to be at HK\$982 million in 2013. The services offered by ESCOs include (i) regarding hardware, building insulations, HVAC, lift and escalator, lighting, electrical circuits and power controls, renewable energy; (ii) regarding software, automation systems, information technology building management systems (centralised monitoring); and (iii) regarding consultancy services, energy efficiency management design and planning, energy auditing, energy monitoring, energy performance contracting. Lighting replacement to more efficient fluorescent lighting, to LED lighting, and HVAC energy improvements are the top three most common works done by ESCOs in Hong Kong.

In respect of the energy management contracting solutions market for lighting projects in Hong Kong, in addition to the market drivers set out above, the move towards the use of more efficient and longer lasting LEDs and T5 compact fluorescent lighting products has also driven the sales and adoption of more efficient and longer lasting LEDs and T5 compact fluorescent lighting products in both households and commercial buildings in Hong Kong. This move was supported by a voluntary charter issued by the Hong Kong government for lighting vendors, targeting those selling light bulbs, to phase out incandescent light bulbs in Hong Kong. On the supply side of this market, a majority of the players include non-ESCO players participating in different stages of the service streams commonly provided as turn-key solutions by ESCOs in Hong Kong.

Further details regarding the demand and supply of ESCOs in Hong Kong (particularly in relation to lighting projects) are set out below in the paragraphs headed "Market overview of energy saving and management solution industry for lighting projects in Australia, China, Hong Kong and Japan" and "Competitive analysis of energy saving and management industry for lighting projects in Hong Kong" in this section.

The value chain of the energy saving and management solution industry of lighting projects

ESCOs can provide a vertically integrated energy solution, with a supply chain spanning from energy-efficient equipment development and production, retail distribution, energy-efficient solution deployment (e.g. audit, project design, and installation), evaluation monitoring & verification, to operation/maintenance.



Source: Adapted from Energy Efficiency Service Sector: Workforce Size and Expectations for Growth, page 2, September 2010, Ernest Orlando Lawrence Berkeley National Laboratory

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Energy service contract models

ESCOs implement energy-efficiency projects on a turn-key basis. Among various models, there are 2 common models employed by the energy efficiency solutions and management industry as described below:

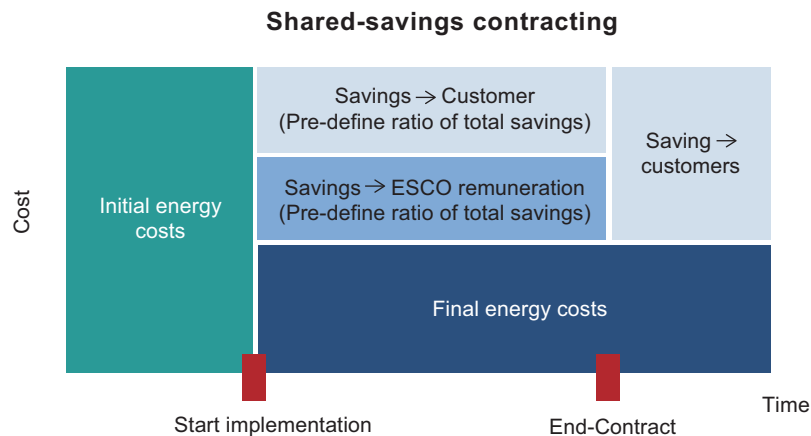
1. Energy Supply Contracting (ESC)

ESC is a business model that the ESCO ensures the delivery of useful energy. The ESCO manages all the investment to deliver the energy to customers and may assume ownership of the energy infrastructure. The agreement is typically run for a long period of time (10-15 years) and is suitable for renewable energy and heat recovery projects.

2. Energy Performance Contracting (EPC)

ESCOs mostly operate through this EPC where they provide a guarantee of minimum energy savings level (compared to the energy baseline or the actual energy usage before the project commencement) and will be remunerated based on the amount of energy savings. "Measurement and Verification" (M&V) is carried out periodically to help quantifying the savings delivered by the project against the baseline energy consumption. There are two popular variations of this contract models.

2.1 Shared-savings Contracting



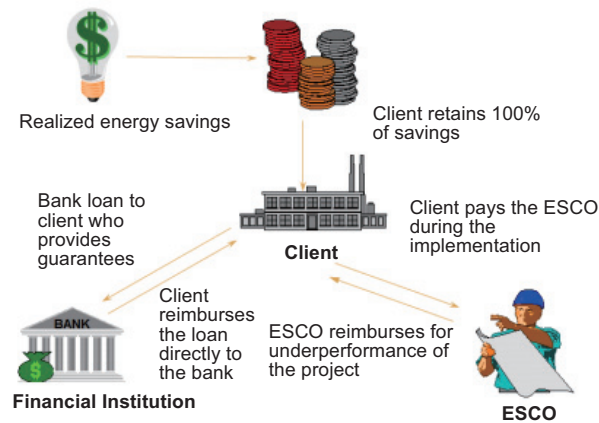
Source: Adapted from European Commission information

In this model, the ESCO is responsible for financing or securing funds with third-party financing entities for the upfront investments. The ESCO receives a percentage of the total savings from the building owner and part of this amount is used to make repayments for the capital costs.

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2.2 Guaranteed-savings contracting

Guaranteed-savings financial model



Source: IFC Energy Service Company Market Analysis, Final Report, Revised, Page 3, June 2011, International Finance Corporation

In this model, the energy end-users are responsible for financing the upfront cost and making repayments, while the ESCO assumes no responsibility in this aspect. The ESCO guarantees a minimum level of energy (or financial) savings and takes over the entire performance and design risk.

Future trends & developments of ESCO and for the lighting sector

The global market for commercial and public building energy efficiency retrofits is expected to grow significantly from 2014 to 2023. Growing adoption of regulatory/policy measures by different regions along with voluntary energy certification programs (e.g. green building certification program, etc.) are likely to be the main drivers for growth in this market. High potential lighting related energy efficient technologies such as LED lighting and digital control systems are likely to revolutionise lighting services in all sectors. LED lamps are projected to significantly surpass all other lighting types in future. However, it is very likely that retrofitting will be an especially lucrative application for fluorescent TIT products.

MARKET OVERVIEW OF ENERGY SAVING AND MANAGEMENT SOLUTION INDUSTRY FOR LIGHTING PROJECTS IN AUSTRALIA, CHINA, HONG KONG AND JAPAN

Demand, needs and supply in selected regions

Australia – In Australia demand for EPCs is still dominated by the public sector with demand by the private sector being relatively limited. Uptake of EPCs is limited in Australia due to limited familiarity with EPCs and ESCOs in general, procurement issues, and financial/funding restrictions, etc.. There are at least 12 to 15 EPC contract providers in Australia. With the ESCO market being relatively new, the experience of the companies involved is sometimes quite limited. The potential customers lack sufficient understanding of opportunities of ESCO investments which impedes ESCO business development in the private sector.

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China – The ESCO industry in China is still in an early stage of development and is growing rapidly. Many new start-ups are entering the market with a registered capital cost of below CNY 10 million resulting in an abundance of smaller-scale ESCOs in the market. In 2012, there were only 18 ESCOs whose revenues exceeded CNY 500 million, while the market size was estimated to be CNY 51.3 billion (US\$8.1 billion). Small ESCOs often lack the capability to perform energy audits, as well as design and manage projects, which prevents them from offering services on a broader scale. In addition, these SMEs may often find financing a bottleneck for their growth. In 2011, bank loans totaled 21% of all ESCOs EPC project financing. Despite the impressive increase in numbers of operating ESCOs the overall scale is relatively small when compared to the great demand for energy services. Based on Ipsos Business Consulting's interview with industry experts, the demand for lighting-related EPC project has tripled over the past three to five years.

Hong Kong – Electricity consumption accounts for more than 65% of the carbon emissions produced in Hong Kong. Buildings are the largest electricity consumers accounting for about 90% of total electricity consumption. Lighting also consumes a significant portion of electrical energy, with illumination accounting for approximately 15% of total electrical energy consumed domestically. Lighting is one of the key sectors with respect to reducing energy consumption.

The growing energy costs also stimulate the need for energy efficiency. Energy costs in Hong Kong are rising due to a depleting fuel supply from Hainan, China, and are gradually being replaced with more sustainable energy sources for power generation, and fuels imported from central Asia.

The Hong Kong Government's 2009 Building Energy Efficiency Funding Scheme has allocated subsidies for approximately one out of every eight buildings in Hong Kong. Pursuant to the BEEO, all commercial buildings in Hong Kong will be audited by registered energy assessors every 10 years to ensure energy efficiency targets are met. Up to 2014, the BEEO audited over 1000 buildings in Hong Kong. With the BEEO introduced, it is estimated that over 30,000 out of the 40,000 buildings in Hong Kong will need to undergo major refitting if they do not pass the government's building energy audits, as well as energy & carbon auditing in the next 10 years to comply with the Building Energy Code.

Lighting efficiency to change to fluorescent bulbs, or LED lighting, has been the most frequent type of retrofitting work carried out for buildings in Hong Kong. Lighting retrofitting is one of the four major retrofitting categories set by the government's BEEO; others include HVAC, escalator and lift, and electrical installation.

Hong Kong's ESCO industry includes about 20-30 (estimated) ESCOs serving the market. The product and services available in the ESCO market include insulation, integrated building energy management systems, HVAC, lighting, lift and escalator, IT solutions, renewable energy course, energy monitoring, and energy auditing.

Japan – In terms of number of ESCO project, Japan has seen fluctuating demand since 2003. Most of the energy savings generated between 1998 and 2011 by ESCO projects come from projects implemented under EPCs. In terms of the overall market size, the guaranteed-savings contract model was adopted first. Since ESCOs started to expand, shared-savings contract also started to be more popular as ESCOs can offer financing as a value-added service. As a result shared-savings contracts now account for the the majority of ESCO contracts in terms of value. Nevertheless, when looking in terms of numbers of projects, the guaranteed-saving contract models remains the most popular model.

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Based on a JAESCO survey in 2010, replacing the air-conditioning system was the most popular energy efficiency measure, followed by the lighting system. In specific to lighting equipment, inverter lighting and HF inverter were the most popular measures, followed by high-efficiency induction lamps and compact fluorescents.

Target customers in selected regions

Australia – The efficient government buildings programs target or have targeted hospitals, offices, courts, water infrastructure, education institutes such as TAFEs (Technical And Further Education), prisons, arts and supporting facilities, etc.. According to the 2013 ESCO Market Report for Non-European Countries, typical ESCO projects in Australia are public buildings and in particular – hospitals and higher education facilities while ESCO activities are limited for the industrial and the tertiary sector.

China – According to EMCA statistics in 2010-2011, 66% of the customers opted for a shared-savings contract model and 20% of customers opted for guaranteed-savings contract model. In specific for lighting projects:

- 1) Shared-savings contract models are mostly used by
 - ✓ Industries with a high level of electricity consumption/high usage of light
 - ✓ Street lighting projects initiated by local governments in third and fourth tier cities

- 2) Guaranteed-savings contract models are mostly adopted by
 - ✓ Smart lighting projects initiated by local governments in first and second tier cities
 - ✓ Lighting retrofit projects in commercial buildings

Hong Kong – ESCOs in Hong Kong primarily target commercial building owners. ESCOs target existing buildings with EPC retrofit offers, particularly single-owner tenant buildings – office buildings, shopping malls, hotels, hospitals and institutions. The average potential customers for retrofitting works would be sizable property owners who are nearing their interior-renovation cycles (5-10 years), major renovations cycles (10-15 years), owners looking for building upgrades, owners looking to reduce operational costs, or owners looking to brand their facilities green.

Japan – Customers group in Japan can be classified into industrial and building sector (including both commercial and public buildings). The building sector has been a major contributor to the ESCO ESP market. Department stores/supermarkets, office buildings, and hospitals are the key customer groups when procuring ESCO projects. The public sector is expected to take the lead regarding ESCO industry development in Japan as it still presents an available growth opportunity.

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ESCO lighting project pricing

Australia – The cost for lighting related projects varies based on the scale and type of project including type of solution/product used. Examples of project cost estimates for different projects are collected in below table.

Examples of lighting project prices in Australia

Project	Project solutions (excluding other project/s related services such as design, testing, post implementation review, etc.)	Overall project cost (including grant or funding if any) – AUD
Narre Warren South P-12 College (Melbourne based school) energy efficient lighting using on-bill finance through the CEFC	Installing new lighting in gymnasium and classrooms through a retrofit-replacing classroom lights with energy efficient T5 lamps and using LED lights in the gymnasium.	\$135,000 retrofit
Lighting upgrade project of three car parks at two Sydney hospitals	lighting upgrade with more efficient lighting	\$520,000

Source: Lighting makes school savings, Clean Energy Finance Corporation(CEFC), <<http://www.cleanenergyfinancecorp.com.au/our-investments/case-studies/lighting-makes-school-savings.aspx>>; Hospitals save on car park lighting-case study from Clean Energy Finance Corporation, <<http://www.cleanenergyfinancecorp.com.au/our-investments/case-studies/hospitals-save-on-car-park-lighting.aspx>>

China – For lighting-related projects, the investment amount varies and depends on the scale of the project (e.g. type of solutions used and numbers of fittings and luminaires). There is also a correlation between project investment and the type of building in different customer segments.

Estimation of investment required by size of projects

Project Size	Required Investment (CNY)
Small	500,000–2,000,000
Small-to-medium	2,000,000–6,000,000
Medium-to-large	6,000,000–10,000,000
Large	>10,000,0000

Source: Ipsos Survey and Analysis

Hong Kong – The price of lighting project varies depending on the type of the project as shown in the table below.

Examples of lighting project prices in Hong Kong

Year	Project	Company	Lighting Project Type	Project Size (HKD)
2012	Helping Hand – Siu Sai Wan	Government	Institutional	\$81,210
2012	The Spastics Association of Hong Kong	Government	Government	\$368,120
2013	The Hong Kong International Airport	Siemens – Osram Prosperity Company Ltd., Government	Government	Save 15,000,000 kwh/year (2009 – 2014)

Source: Ipsos Analysis

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Future Trends & Developments in selected regions

Australia – The ESCO market in Australia has yet to form a wider commercial basis. Its development also greatly depends on future steps taken by policy makers. Under the Environmental Upgrade Agreement (EUA) AUD 80 million (including AUD 30 million from CEFC) are available for retrofitting (including energy efficient technologies such as lighting) commercial buildings. EUA enables clients (building owners) to tie and secure the loan/finance to the property and make repayments through charging the local council on the land. The Australian lighting market is expected to largely follow the trends in other advanced western nations where the market value will grow in the near future.

China – As China is phasing out incandescent lamps since 2012, it is expected that more energy-efficient lighting technologies will gradually become more mainstream. This expected demand will also incentivise manufacturers to push these products especially for the retrofit market. In addition, the awareness of green lighting has increased amongst consumers. This awareness has been also fostered by continuous efforts from the government.

Starting in March 2013, large commercial banks have been reluctant to extend credits to many small-scale ESCOs. Without the financial backing from large commercial domestic banks and the sluggish economy, the industry is expected to gradually move on from its current high growth phase. This increases the risk burden and adds liability to the business making it harder for the smaller players to survive.

Hong Kong – The rising fuel costs are expected to gradually increase the electricity tariff and this situation is likely to drive building owners to building energy improvement projects.

The BEEO, which has come into full operation since 2012, is likely to generate more opportunities for future ESCO business. A study conducted by the Electrical and Mechanical Services Department in 2013 anticipates the BEEO scheme to generate 2.8 billion kwh of energy savings for the first 10 years of its implementation. ESCOs are expected to benefit from the BEEO due to commercial buildings in Hong Kong facing 10 year mandatory energy auditing cycles, with the first group of energy audits being carried out in 2012.

The BEEO will also help the lighting retrofit market to expand, as lighting retrofit EPCs have the potential to save about 50%-70% of electricity consumption, translating to energy and maintenance cost savings incentives for building owners. The commercial sector's increasing adoption of lighting upgrades to reduce facilities cost is also fuelled by the voluntary phasing out of incandescent light bulbs in Hong Kong, and the longer life-cycles of LEDs and T5 light tubes. Thus with the 2011 voluntary phasing out of incandescent light bulbs, rising electricity tariffs, and the BEEO energy compliance measures, the demand for energy consultations and retrofit lighting projects is expected to increase in the next 4-5 years.

The property management sector of Hong Kong is a prominent example of the growing energy saving trend, as the top five largest property management companies in Hong Kong have set overall energy reduction targets at 15-20% of their 2008 electricity consumption levels by 2020, and have progressively managed to reduce overall electricity consumption by 1.7%-2.4% (Greenpeace).

Japan – The penetration of LED luminaires is steadily increasing and has now reached US\$5.2 billion. This currently makes it the largest Asian market. In addition, the consequent energy shortage following the Fukushima disaster in 2011 created awareness and demand for energy-saving equipment including luminaires. In the most optimistic scenario, Japan expects LED to replace all less energy-efficient lamps by 2050.

Further, the government sees its role as creating awareness of energy efficiency and to resuscitating the ESCO industry. The promotion of ESCOs has been one of the topics in the latest Strategic Energy Plan.

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COMPETITIVE ANALYSIS OF ENERGY SAVING AND MANAGEMENT INDUSTRY FOR LIGHTING PROJECTS IN HONG KONG

Supply

A majority of the supply side players in the energy management contracting for lighting market in Hong Kong include non-ESCO players participating in different stages of the service streams commonly provided as turn-key solutions by ESCOs in Hong Kong. These suppliers include (1) lighting suppliers and manufacturers, (2) engineering companies, and (3) energy consultancy and auditors. Non-ESCO players in the energy saving industry accounts for approximately 40% of the energy saving market for lighting.

Demand

The demand for lighting projects in Hong Kong is mainly driven by government building energy efficiency legislation and codes, and from property operations cost management by building owners. The relevant codes and ordinances include the Building Energy Codes & BEEO for commercial buildings in Hong Kong enacted in 2012. All commercial buildings in Hong Kong of over 500 sq.m. face a 10 year cycle energy auditing by the Hong Kong Government to meet carbon emission and energy saving targets for the place's 2030 carbon emissions goals.

Most building owners also opt for changing lighting in buildings to LED or T5 fluorescent lights. From an installation perspective, lighting retrofits are much less complex than a HVAC project, and can on average save up to 50-70% of electricity usage by lighting. Under a shared-savings arrangement, often the payback period for lighting projects are under two years, and much shorter than HVAC projects. The significant financial savings from improving lightings in buildings, lower capital cost for installation and short payback period time for lighting projects drives the demand in lighting projects by energy management companies from building owners.

Solutions, services and target customer features in Hong Kong

With a small industrial and manufacturing sector, up to 90% of total electricity consumption is consumed by all buildings annually in Hong Kong. Hong Kong ESCO EPC for lighting focuses on building retrofitting, particularly existing commercial buildings. The energy management contracting solution for lighting in Hong Kong targets commercial buildings, large commercial building renovation projects, institutional buildings, and large energy consumers such as property management companies as the building ownership arrangement (owner-occupied or single-tenant buildings) streamlines the contracting services and management over energy performance contracting in a lighting retrofit project and energy management in a building.

Hong Kong lighting projects by energy management companies often offer shared-savings and guaranteed savings financial models to cover the initial cost of the projects. Under the contract, ESCO's EPC services would offer a full-line turn-key service to commercial building owners in Hong Kong, in which lighting supplies, installation, financing and energy monitoring will be offered during the contracting period.

ESCOs often cover a range of hardware, software and consultancy services in Hong Kong for commercial building lighting retrofits. On the consultancy side, EPCs include professional energy auditing, measurement and verification, energy design and planning, energy monitoring systems, and energy performance contracting. On the equipment side, EPCs can include building insulation installation, building energy management systems, HVAC upgrading, lighting upgrading, lift and escalator energy improvements, and renewable alternative fuel source installations.

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The nature of competition and key competitors

A wide range of companies is active in energy saving, such as equipment suppliers, engineering contracting companies, energy auditing and consulting companies, specialised or full service local ESCOs, utility-based ESCOs, and international energy companies. The majority of players in Hong Kong's energy saving market only provide limited services, such as energy auditing, or consulting services. These companies often do not offer installation and EPC services for retrofitting projects.

For Hong Kong's local market EPC projects would typically be financed either by ESCOs or financial institutions. For ESCOs that require financing under the Small & Medium Business Credit Guarantee Fund this can be a competitive disadvantage, especially when compared to providers with greater financial means such as self-financed ESCOs.

Lighting energy saving projects in Hong Kong are carried out by ESCOs and non-ESCO companies. There are around 15 ESCOs, and several non-ESCO players participating in the lighting EPC market in Hong Kong. Altogether, these companies generate a total of HK\$ 590 million for the lighting EPC market in 2013 for Hong Kong. Among the 15 ESCOs engaged in lighting EPC projects, three of these ESCOs specialise in lighting and either produce or supply LED and T5 lighting products. These three ESCOs are: Powertech (Hong Kong) Ltd., Tomi Fuji EMC Ltd and our Group. The utility company China Light and Power is an example of a non ESCO active in the market and a major player in the energy saving market.

Hong Kong's ESCO market for lighting projects is still developing and estimated to have reached around 10% of its maximum potential based on 2013 figures. The market is growing with the industry developing rapidly from an early adopter customer base to a wider spread customer base.

Ranking of the top five energy management contract providers for lighting projects in Hong Kong in 2013 (by revenue)

Rank	Name of company	Headquarter Location	Revenue in 2013 (HK\$ million) (Note)	Share of Total Industry Revenue (Note)	Major Service Scope
1	CLP Engineering Ltd.	Hong Kong	105	17.8%	HVAC, Energy Management Systems, Lighting, Power Industry Consultancy, E&M Engineering
2	Powertech (Hong Kong) Ltd.	Hong Kong	80	13.6%	Lighting, Industrial Power Motor Controller
3	Telex Environmental and Energy Management Limited	Hong Kong	39	6.6%	E&M Design and Consultancy, Environmental Management and Consultancy, Energy Management Service
4	Our Group	Hong Kong	34	5.8%	Lighting, HVAC
5	Tomi Fuji EMC Ltd	Hong Kong	19	3.2%	Lighting, HVAC, Solar Energy
	Others		313	53.0%	
	Total		590	100%	

Source: Ipsos Analysis

Note: The estimation is based on, among others, the number of companies, the size of companies, the sales and trading revenue figures of the company, correlations between project size and type of EPC services and revenue, official public data released by the Hong Kong Government, annual reports of listed companies, and interviews with key players.

Market share of the Company in the energy saving and management solution industry in Hong Kong, and in particular energy management contracting solution market for lighting projects in Hong Kong in 2013

CLP Engineering Ltd. (a subsidiary company under CLP Holdings Ltd. Hong Kong), Powertech (Hong Kong) Ltd., Telex Environmental and Energy Management Limited, our Group and Tomi Fuji EMC Ltd are the leading EPC providers for lighting projects in 2013.

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The top five ESCOs providing EPC services in lighting projects in Hong Kong accounts for approximately 47% of the total revenue of the energy saving and management solutions industry. As of 2013, our Group held approximately 3.5% market share of the energy saving and management solutions industry, and approximately 5.8% market share of the energy saving and management solutions for lighting industry.

Description of the energy saving and management solution industry in Hong Kong, focusing on energy management contracting solution market for lighting projects

Energy consumption from buildings in Hong Kong has increased by about 20% in per capita terms in the past decade but increased economic development has not necessarily been accompanied with increased energy efficiency and mandatory compliance to Building Energy Code alone is expected to reduce Hong Kong's annual emissions by 0.5%.

Market drivers

Energy performance contracting is a financing technique that raises capital for investments in energy efficiency projects based on future savings. This is a core concept of the ESCO business model and key driver of the market, wherein the contractors take the risk of not achieving targeted savings. The market growth is further supported by:

- Provision of turn-key services (e.g. all in one services such as energy audit, retrofit and financing) by contractors
- Higher saving potential when carrying out a projects through an ESCOs rather than if done by the client
- Payout of improvements in energy performance
- No or limited requirement for client-side expertise in this sector

From the supply side, the market is driven by favorable government policies – e.g. Building Energy Code, BEEO, and previous subsidy programs for energy efficiency retrofitting projects.

The market growth also profits from pull factors such as the demand for energy performance contracting growing due to:

- "Pay-by-savings" service model including the project finance arrangements and/or the upfront capital payment by ESCOs. This payment method based on cost savings encourages market growth even in the absence of government financing schemes
- Decreasing operating and maintenance costs along with improved energy performance
- Provision of green building rating schemes certification such as Leadership in Energy and Environmental Design (LEED)
- Increasing property value (rental and asset value) by enhancing reputation through transformation of the existing buildings into green buildings

Entry barriers

Despite of a huge potential for applying EPC, there are still market barriers:

- The ESCO industry in Hong Kong is relatively new and at an early stage, several ESCO industry stakeholders (contractors, lawyers, banks, building owners) are not aware of this industry's workings including financing methods and EPCs
- Performance contracts are unique documents, based on fairly complex transactions, including contract performance and the methodology for measuring savings and calculating payments. ESCOs and potential customers often find it difficult to decide on contract terms and understand the duties, obligations and risk allocation

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- EPCs require a different approach from conventional contract and tendering procedures. For example, the particular specifications often cannot be specified but have to remain open to different saving strategies and the contract period will depend on the financial investment strategy. The current procurement processes and financial controls, such as the accounting system in government projects, still hinder the adoption of EPCs
- The measurement and verification (M&V) methods must be agreed before entering into an EPC. Reasonable changes or adjustments should also be allowed since important factors may change over years. The complexity of estimating building energy performance and the lack of commonly accepted standards for measuring energy savings have impeded the application of EPCs
- Electricity tariffs in Hong Kong have been lagging behind consumer prices and wages over the past decade. Prices are half that of Singapore, one third of Sydney and approximately 80% of Japan's electricity prices

Opportunities

- Beginning de-regulation policy in Hong Kong, power companies have to enhance their service and competitiveness
- Development of building energy codes in Hong Kong will significantly impact the work for energy efficiency improvement
- Increased economic development has not been accompanied with increased energy efficiency
- Hong Kong Productivity Council is building strategic alliances with local power companies to promote EPC
- There is increasing awareness and growing concern for energy efficiency
- EPC projects arranged similar to conventional retrofitting projects are becoming more common. Building owners paid in full once the construction and installation works were completed, with the added benefit of a guarantee on energy savings and annual reporting on the actual performance of newly installed systems

Threats

- Consumers worry about the complexities, lack of familiarity with EPC
- Long payback periods hinder implementation of new measures in buildings such as change of operation schedule, change for system set-points, alteration of premises
- ESCOs may lack capital and technological know-how
- Building owners are unfamiliar with the setup of EPC projects compared with traditional "fee for service" or "design-bid-build" projects
- Building owners have no competent in-house engineering team, difficulties to understand the impact on actual energy savings when the current conditions significantly deviate from baseline conditions
- Penetration rate of EPC projects is still low and those projects have mainly been implemented by the private sector
- There may be mismatch of expectation between building owners and ESCOs
- Lack of an approach in promoting building energy efficiency
- ESCOs are exposed to potential risk of repayment, as when actual energy savings fall below the guaranteed values, ESCOs have to compensate the losses

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Qualitative and quantitative discussion of the competitive advantage of our Group, compared to the core competitors

Our Group offers performance based contracts, among other services, which can be highly beneficial for the end customer making it a competitive advantage in the market. Performance based contracts are more attractive because:

- Reduced risk – the contractor guarantees and takes on the risk of not achieving savings
- Turn-key services – the performance contractor provides all required services (for example, to do all necessary energy audits and retrofit)
- The end customer needs less internal expertise
- Project financing can be 'off balance sheet' and doesn't affect debt load
- State-of-the-art products and services can be used
- Savings can be much higher than if the business or institution carries out the work itself
- Additional improvements to environmental performance can be paid out of the savings

Our Group covers the top two energy efficiency measures in Hong Kong and globally, by offering EPC services in lighting and HVAC. Base on a study conducted by The Hong Kong Polytechnic University in 2014, the top 3 building energy retrofit works, and potential retrofit works in descending order are (1) lighting replacement to more efficient fluorescent lamps, (2) improvement of existing air-conditioning AC systems (HVAC), and (3) lighting replacement to LED lamps, showing that our Group's offer is in line with current market demand.

So far none of the key ESCO competitors for lighting projects in Hong Kong are publicly listed (as of 2014 year-end), making it an advantage to be publicly listed and having access to the stock market for refinancing.

Currently none of the key ESCO competitors, with production capacity has comparable patented technology in the Tube-in-Tube segment, which combined with our OEM and ODM capabilities constitutes another competitive advantage.

A solid track record is important for demonstrating capability, capacity and trust to potential customers. Our Group has been able to grow at a rapid pace, and being an ESCO which has one of the longest track records in Hong Kong in the ESCO sector makes this a distinguishing factor when comparing with competitors.

Our Group's offering compared to the market offer

Providing the full range of services from product, assessment, installation and financing, is an important criterion in the market as not being able to offer a service can drive potential customers to other providers. Most competitors do not offer the full range of in-house services and provide turn-key services with experts at every stage.

Our Group offers an integrated service including consultation, own patented products, research and development capability, certified carbon audit managers, a deployment/installation team and licensed maintenance team which can provide technical support to our clients. It covers the whole range of services throughout the energy saving company value chain, which sets it apart from a large number of competitors in this sector.

Our Group began operations in 2009 and can be considered to be a pioneer in the ESCO market. Clients can be either end users or companies further up the value chain such as engineering, procurement, or design companies (EPC companies). These clients are offered a wide range of products, mainly focusing on indoor lighting. This offer is especially attractive for light intensive applications e.g. retail, office buildings due to the high potential savings but clients come from a wide range of industries and applications.

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Our Group offers a superior product in fluorescent T5 tubes, Tube in Tube (TIT), for lighting retrofitting projects. "Tube-in-Tube" Fluorescent Lamp is a retrofit product, meaning its installation does not require replacement of the existing lighting fixtures. Hence, upfront investment will be reduced for lower material and labour costs. Further, as the performance of TIT technology is benchmarking with that of LED but involves lower cost, it enables a shorter payback period for our Group (around 12 to 15 months according to our Company during the Track Record Period, compared with a general payback period of under 2 years for a shared-savings arrangements in Hong Kong, and compared to a case study in Canada with payback period of 3.6 years, as set out in the Ipsos Report) and a more flexible offer to share savings to our EPC customers.

Our Group is able to offer easy adoption and sustainable solutions for retrofit works with TIT, whereas most energy saving lighting solutions would normally require replacement and/or modifications of lighting fixtures that creates material wastages, and hence are relatively more time consuming with higher costs. This is especially advantageous compared with competitors that offer only LED or standard T5 products. This ability to efficiently retrofit could be especially useful with the BEEO demanding mandatory energy audits that encourage major retrofitting works.

The current overlap of lighting technologies highlights the importance of consulting, making the combination of consulting and unique product a standout criteria. Almost all ESCOs offer both fluorescent and solid state lighting, but very few have their own unique branded and patented products on offer. In addition very few companies can look back on the same amount of experience which makes our Group stands out from its competitors.