Developing a vibrant ESCO Market - Prospects for South Africa’s energy efficiency future
Foreword

The green agenda is a key priority focus of the IDC, in fulfilling government’s objectives of creating a greener economy, supporting job creation and localisation opportunities. This commitment has been demonstrated most visibly by the R25 billion earmarked for investments in green industries and initiatives over the next five years. Specific focus areas include; renewable energy, fuel based green energy including emission and pollution management and bio fuels.

Energy efficiency has been one of the most prominent underdeveloped opportunities in South Africa and has been earmarked by IDC as an opportunity to address market failure through pro-active intervention. To this extent IDC has partnered with international funders like the German Development Bank, KfW, to develop these markets through funding, including technical support. Energy Service Companies (ESCOs) provide a platform to establish and develop energy efficiency opportunities with an emphasis on achieving successful demand side management interventions. The IDC recently commissioned a study that researched the prospects for South Africa’s energy efficiency future by developing a vibrant ESCO market. The report provides a detailed analysis of the ESCO market, identifies key challenges and market barriers from a financial, technical or regulatory point of view, and recommends strategies and instruments to address the identified barriers.

The findings will assist IDC to become more pro-active and efficient in developing an enabling environment and support towards a vibrant ESCO industry. It will also assist industry players to better understand the environment and challenges, and will enable them to develop strategies to overcome barriers and support future sustainable growth.

RENTIA VAN TONDER
HEAD GREEN INDUSTRIES SBU
Executive Summary

In view of the current energy supply constraints and the need for energy efficiency initiatives, it is recognised that a healthy Energy Services Company (ESCO) industry is essential. The purpose of the ESCO market study was therefore to identify possible hurdles that were impeding this industry.

South Africa's ESCO industry is still in its infancy. It consists of a multitude of small players (in excess of 400) and is dominated by only a few significant large ones. By contrast, in developed countries such as the USA, the ESCO market is dominated by a few very large corporations.

The Eskom Integrated Demand Management (IDM) programme is by far the largest source of funding for ESCOs in South Africa and the reliance on a single source of funding may be a risk to the sustainability in the industry.

This study highlighted the significant potential in the energy efficiency and consequently in the ESCO market. A conservative estimate of the value of the ESCO market, based on targeted energy savings and assumed market penetration, is between R2.6 billion and R7.8 billion over the next three years. The drivers for this market are:

- the electricity supply crisis
- the increasing cost of energy
- the increasing pressure to mitigate climate change impacts, including the introduction of the proposed Carbon Tax in 2013/2014, and
- the introduction by government strategies, policies, legislation and taxes such as new building regulations and tax incentives (e.g. S12L for energy efficient equipment).

The potential growth of the industry is, however, constrained by a number of barriers, the key ones being the following:

- market scepticism and lack of trust in the ESCO industry due to a lack of accreditation of credible ESCOs
- low level of awareness, information and understanding of the ESCO concept
- the provision and availability of registered Measurement and Verification professionals
- lack of financial instruments specifically developed for financing the ESCO industry
- project approval delays from all parties, including financiers, clients and Eskom, and
- high upfront costs of energy audits.

In response to the barriers identified in this report, the following key recommendations are made:

- the introduction of a system of accreditation of ESCOs by an independent authority
- ensuring greater access to affordable and appropriate training
- further simplification and streamlining of the Eskom IDM approval process
- standardisation of project contract documentation
- the introduction of internationally recognised financial instruments, and
- mechanisms to fund the costs associated with the initial energy audit and the project approval process;

Whilst funding has been identified as a key issue to be resolved, there is no single intervention that will ensure the development of a vibrant ESCO market in South Africa. A combination of interventions, ranging from accreditation, awareness campaigns, skills development, financing solutions, energy efficiency legislation and policies, will be required.
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<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>BESCO</td>
<td>Black Energy Service Companies Association</td>
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<td>CAESCO</td>
<td>Canadian Association of ESCOs</td>
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<tr>
<td>CDM</td>
<td>Clean Development Mechanism</td>
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<tr>
<td>CEA</td>
<td>Certified Energy Auditors</td>
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<tr>
<td>CEM</td>
<td>Certified Energy Managers</td>
</tr>
<tr>
<td>DFI</td>
<td>Development Funding Institutions</td>
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<tr>
<td>DoE</td>
<td>Department of Energy</td>
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<tr>
<td>DSM</td>
<td>Demand Side Management</td>
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<td>DME</td>
<td>Department of Minerals and Energy</td>
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<tr>
<td>dti</td>
<td>The Department of Trade and Industry</td>
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<tr>
<td>EDC</td>
<td>Energy Development Corporation</td>
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<td>EE</td>
<td>Energy Efficiency</td>
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<td>EEDSM</td>
<td>Energy Efficiency and Demand Side Management</td>
</tr>
<tr>
<td>EESL</td>
<td>Energy Efficiency Service Limited (India)</td>
</tr>
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<td>EPC</td>
<td>Energy Performance Contracts (Energy Performance Saving Contracts)</td>
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<td>ESI</td>
<td>Energy Savings Insurance</td>
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<td>ESCO</td>
<td>Energy Service Company</td>
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<td>ESPC</td>
<td>Energy Performance Saving Contracts/Energy Performance Saving Contracting</td>
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<td>Fi</td>
<td>Financial Institutions</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GEF</td>
<td>Global Environment Fund</td>
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<tr>
<td>GWh</td>
<td>Giga-Watt Hour</td>
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<tr>
<td>HVAC</td>
<td>Heating, Ventilation and Air-Conditioning</td>
</tr>
<tr>
<td>IDC</td>
<td>Industrial Development Corporation</td>
</tr>
<tr>
<td>IDM</td>
<td>Integrated Demand Management</td>
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<tr>
<td>IEA</td>
<td>International Energy Agency</td>
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<tr>
<td>IEUG</td>
<td>Intensive Energy Users Group</td>
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<tr>
<td>kWh</td>
<td>Kilo-Watt Hour</td>
</tr>
<tr>
<td>MEPS</td>
<td>Minimum Energy Performance Standards</td>
</tr>
<tr>
<td>MMFA</td>
<td>Municipal Management Finance Act</td>
</tr>
<tr>
<td>M &amp; V</td>
<td>Measurement and Verification</td>
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<tr>
<td>MSDP</td>
<td>Multi-State DSM Programme</td>
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<tr>
<td>MUSH</td>
<td>Municipalities, Universities, Schools and Hospitals (United States)</td>
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<tr>
<td>MW</td>
<td>Mega-Watt</td>
</tr>
<tr>
<td>MWh</td>
<td>Mega-Watt Hour</td>
</tr>
<tr>
<td>NEEA</td>
<td>National Energy Efficiency Association (Now part of SANEDI)</td>
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<td>NEES</td>
<td>National Energy Efficiency Strategy</td>
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<tr>
<td>NERSA</td>
<td>National Energy Regulator of South Africa</td>
</tr>
<tr>
<td>O &amp; M</td>
<td>Operation and Maintenance</td>
</tr>
<tr>
<td>p.a</td>
<td>Per Annum</td>
</tr>
<tr>
<td>PCF</td>
<td>Partial Credit Guarantee</td>
</tr>
<tr>
<td>PFI</td>
<td>Private Financial Initiatives</td>
</tr>
<tr>
<td>PICO</td>
<td>Public Internal Performance Contracting (Germany)</td>
</tr>
<tr>
<td>PICO</td>
<td>Public Internal Performance Commitment (Italy)</td>
</tr>
<tr>
<td>PRGF</td>
<td>Partial Risk Fund Guarantee</td>
</tr>
<tr>
<td>PROESCO</td>
<td>Virtual Guarantee Fund under BNDES</td>
</tr>
<tr>
<td>RATIRR</td>
<td>Real After Tax Internal Rate of Return</td>
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<tr>
<td>REFIT</td>
<td>Renewable Energy Feed-In Tariff</td>
</tr>
<tr>
<td>ROI</td>
<td>Return On Investment</td>
</tr>
<tr>
<td>SAAES</td>
<td>South African Association of ESCOs</td>
</tr>
<tr>
<td>SANEDI</td>
<td>South African National Energy Development Institute</td>
</tr>
<tr>
<td>SANERI</td>
<td>South African National Energy Research Institute (Now part of SANEDI)</td>
</tr>
<tr>
<td>SANS</td>
<td>South Africa National Standards</td>
</tr>
<tr>
<td>SWH</td>
<td>Solar Water Heaters</td>
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<tr>
<td>VCF</td>
<td>Venture Capital Fund</td>
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1. Introduction background and objectives

Although South Africa’s Energy Service Company (ESCO) industry was formally established in 2002, following the introduction of the Eskom Demand Side Management (DSM) Fund, the ESCO market is still far from tapping its full potential and is not developing into a vibrant growing industry as one would expect. This low level of market penetration is perceived as one of the key barriers for the implementation of energy efficiency investments in South Africa.

This study aims to identify reasons and suggest measures that can assist the growth of the ESCO market in South Africa by providing a baseline analysis of the ESCO market; it identifies key challenges and market barriers (real/perceived) from a financial, technical or regulatory point of view and recommends strategies and instruments to address the identified barriers.

The objectives of this study were to provide insights into the ESCO industry in South Africa by providing:

- a review of international best practices in ESCO market development and benchmark the current status of ESCO industry in South Africa
- a detailed analysis of the South African ESCO market based on structured interviews and questionnaires targeted at ESCOs, financial institutions and end users, as well as a stakeholders workshop to consolidate the findings
- existing and/or perceived barriers in the ESCO market
- an evaluation of enabling programs, institutions, policies, regulations, strategies to overcome barriers, and
- a high level review of Financial Instruments in South Africa and the use of alternative Financial Instruments to assist in the development of a vibrant ESCO market.

2. Energy scenario in South Africa

Energy supply scenario

The prospect for ESCOs in South Africa can only be understood in the context of the energy scenario in South Africa. The energy crisis that affected South Africa in 2007 and 2008 was a significant factor in the development of Demand Side Management (DSM) and other energy efficiency initiatives in South Africa and is expanded upon below to provide further context. A summary of the supporting regulatory and policy environment is provided on pages 8 to 9, as the final element of the analysis of the energy scenario in South Africa.

The South African energy sector is dominated by coal which is abundant and relatively cheap by international standards. Most of South Africa’s liquid fuel requirements are imported in the form of crude oil. The supply scenario indicates that coal accounts for almost two thirds of the primary energy supply followed by crude oil with almost a quarter, whilst nuclear, renewable and wastes accounting for just over ten percent. About 60% of the coal produced is consumed for electricity generation (DME 2009).

Energy consumption profile

The South African economy can be divided into five economic sectors: industry (including mining), commerce and public services, transport, agriculture, and residential. The commerce sector includes public services government, offices, shops, hospitals, education, entertainment and museums.
The final energy demand breakdown has been reasonably consistent over the last decade and is dominated by the industrial sector with 41%; which includes manufacturing and mining, followed by transport (20%), residential consumption (20%), commerce (8%), public services (8%) and agriculture (3%).

Eskom generates approximately 95% of the electricity used in South Africa and directly provides electricity to about 45% of all end-users in South Africa. The other 55% is resold by redistributors (including municipalities).

As indicated in figure 1 above, mining and industry accounts for the highest electricity sales at 43.7%, followed by municipalities at 43.4%

The Eskom electricity demand therefore provides a good indication of possible areas where energy efficiency initiatives can be targeted, with mining and industry leading at 49% of sectoral demand, followed by the residential demand sector at 35%.

**Source: Eskom 2012**

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**Energy crisis in South Africa**

The White Paper on the Energy Policy of South Africa, which was published in 1998, warned that power-generation capacity would be insufficient to meet the requirements of the country by 2007. In the fourth quarter of 2007, a national crisis developed when the overall demand for electricity exceeded Eskom’s generating capacity, mainly due to unplanned equipment failures, a shortage of coal supply and coal quality issues (South African Government, 2008). The situation was aggravated by high levels of maintenance activities (which were planned to be performed during the summer months when demand levels are traditionally lower) and unusually wet weather, which worsened the coal supply situation.

To prevent the national electricity supply network from becoming unstable during this time, Eskom undertook extreme measures through load shedding exercises in the form of rolling blackouts to different municipal areas in the country. Load shedding continued for about ten months, after which Eskom was able to supply the required demand.

The supply and demand situation during this period was so delicate that rolling blackouts were becoming an almost weekly occurrence in most areas of the country. The state of the electricity system in South Africa (in itself) became one of the major drivers for energy efficiency services in South Africa. The government responded to this crisis by identifying programmes on the supply as well as the demand side of the energy equation. On the supply side, renewed focus was given to the expansion of the existing generating capacity, through the building of new power stations as well as the return-to-service (de-mothballing) of old plants. On
the demand side, power conservation was initiated by enforcing large energy users, e.g. gold mines steel producers, to reduce their demand by between 8% and 15% for a drastic but short-term solution.

Medium and longer term demand-side initiatives included ‘Customer Behavioural Change’ programmes which would be conducted by Eskom and local government to increase the awareness of energy efficiency options; the implementation of which would ensure a positive influence on electricity demand. These programmes focused on energy efficient technologies and policies and included the use of efficient lighting and solar water heaters (SWH) (South African Government, 2008).

Since 2008, Eskom has embarked on an ambitious R300bn investment programme in new generation capacity. However, the two main coal-fired stations under construction (Medupi and Kusile, both rated at 4800 MW each) will only come on line during the next five years, whilst the current system supply constraints are urgent.

The electricity system reserve margin has recovered somewhat from its lowest point in 2007, but it will remain tight into the foreseeable future (Eskom, 2012).

**Energy related policies**

The following is a summary of the various policies and regulations which are relevant to the development of energy efficiency initiatives that have been adopted by the SA government in recent years:

<table>
<thead>
<tr>
<th>Table 1 - Summary of policies, regulations and standards affecting the South African ESCO industry</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy White Paper of 1998</strong></td>
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<tr>
<td><strong>National Energy Efficiency Strategy for South Africa 2005 (NEES), Reviewed 2008</strong></td>
</tr>
<tr>
<td><strong>Electricity Regulation Act (Act 4 of 2006)</strong></td>
</tr>
<tr>
<td><strong>National Energy Act (Act 34 of 2008)</strong></td>
</tr>
<tr>
<td><strong>Integrated resource plan (IRP) 2010</strong></td>
</tr>
<tr>
<td><strong>Industrial Policy Action Plan (IPAP2) 2012/2013 – 2013/14</strong></td>
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</tbody>
</table>
Industrial Policy Action Plan (IPAP) 2014/2015, Released by the dti for public comment 2012

IPAP 2014/2015 includes the Manufacturing Competitiveness Enhancement Programme (MCEP) that will provide enhanced manufacturing support. The Production Incentive (PI) programme will include a Green Technology Upgrading Grant of between 30-50% for investments in technology and processes that improve energy efficiency and greener production processes.

Income Tax Act – Regulations on tax allowances for Energy Efficiency Savings

S12I allows for additional depreciation allowances up to 55% for Greenfield projects over R200 million, one of the rating criteria being energy efficiency savings.

S12L provides a tax deduction to a taxpayer who is energy efficient, with a focus on renewable energy.

Other tax allowances that are applicable to business include S12C, S11e, S13 and others that provide general depreciation of asset allowances that are applicable not only to ESCO businesses, but also to any business that meets the section requirements.

Building Regulations & Building Code (SANS 10400-XA:2011) with SANS 204

The regulations require construction standards on energy efficiency and energy use in the built environment, with all new buildings requiring energy efficiency initiatives prior to municipal approval.

SANS 941: Energy efficiency of electrical and electronic apparatus

This standard covers energy efficiency requirements, measurement methods and energy efficiency labelling of electrical and electronic apparatus, thus impacting manufacturers and importers.

Carbon Taxes-2013/2014

It is envisaged that a carbon tax, proposed by the National Treasury, will be implemented in 2013/2014 at a rate of R120 per ton of carbon dioxide equivalent (CO2e) on direct emissions and will increase by 10% p.a. until 2020.

Gazetted energy tax incentive regulations

The National Treasury, and the Department of Energy have gazetted Energy Efficiency Tax Incentive Regulations that will incentivise investment in energy efficiency measures and these should be finalised at the end of 2012.

3. Energy efficiency potential

South Africa has a higher energy usage intensity when compared to other developing countries like India, China, Brazil, Mexico, etc. Equally, South Africa ranks among the top in carbon emissions, surpassing even the developed countries of North America and Europe. It therefore stands to reason that there is a significant opportunity for the introduction of energy efficiency solutions in South Africa.

In order to promote energy efficiency and a sustainable clean economy, the South African government has rolled out stringent targets, regulations and several investment friendly policy initiatives in the past decade.

The National Energy Efficiency Strategy 2005 (NEES) has set a target of 12% reduction in the overall primary energy consumption by 2015. The eight key goals and reasons for energy efficiency remain as important today and are summarized below:

- job creation
- alleviate energy poverty
- reduce environmental pollution and CO2 emissions
- improve industrial competitiveness
- enhance energy security, and
- reduce the necessity for additional power generation capacity.
Industry is the biggest consumer of final energy, consuming around 49% of the total electricity supplied as noted in Figure 2, and around 41% of the country’s energy consumption.

**Potential for savings and investment**

Very few studies have been commissioned in the past to quantify the energy saving potential of energy efficient technologies in South Africa’s industrial sector. As a result it is a challenge to provide an estimate of savings potential, and consequently it is difficult to accurately estimate the market potential for ESCOs in South Africa without proper detailed modelling. However an Eskom initiated study indicated that 12 933 MW of energy demand savings could be achieved in South Africa as noted in table 2 below:

<table>
<thead>
<tr>
<th>Technology</th>
<th>Residential</th>
<th>Commercial</th>
<th>Industrial</th>
<th>Total MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficient Lighting</td>
<td>939</td>
<td>115</td>
<td>116</td>
<td>1 170</td>
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<tr>
<td>Solar Water Heating</td>
<td>3 713</td>
<td></td>
<td></td>
<td>3 713</td>
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<tr>
<td>Domestic Cooking Conversion</td>
<td>2 144</td>
<td></td>
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<tr>
<td>Infra red heating</td>
<td>766</td>
<td></td>
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<td>766</td>
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<tr>
<td>Heat Pumps</td>
<td>960</td>
<td>224</td>
<td>569</td>
<td>1 753</td>
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<tr>
<td>Showerheads &amp; Restrictors</td>
<td>240</td>
<td>160</td>
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<td>400</td>
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<td>Load Management</td>
<td>9</td>
<td>200</td>
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<td>209</td>
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<td>HVAC</td>
<td>14</td>
<td>70</td>
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<td>Agricultural Initiatives</td>
<td>144</td>
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<td>144</td>
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<tr>
<td>Efficient Compressed Air</td>
<td></td>
<td></td>
<td>1 255</td>
<td>1 255</td>
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<tr>
<td>Motor Efficiency</td>
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<td>408</td>
<td>408</td>
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<tr>
<td>Variable Speed Drivers</td>
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<td></td>
<td>417</td>
<td>417</td>
</tr>
<tr>
<td>Fan/Pumps</td>
<td></td>
<td></td>
<td>530</td>
<td>530</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>8 762</strong></td>
<td><strong>666</strong></td>
<td><strong>3 565</strong></td>
<td><strong>12 933</strong></td>
</tr>
</tbody>
</table>

Source: Eskom, 2012

The above information clearly indicates that there is a large growth potential for the ESCO market, especially in the residential/municipality sector, where 68% of the potential savings have been identified.

**Future outlook/growth potential**

The growth potential within the ESCO industry remains strong with Eskom’s long-term saving targets set at another 5 500MW by 2020, which is in line with the National Energy Efficiency Strategy, albeit on a slightly more accelerated time frame.

Driving forces for ESCOs from industry will be the continued fear of rolling black outs, penalties, tax incentives, carbon tax requirements, commercial and residential building energy saving initiatives, process optimisation required to reduce cost, a greater focus on green and sustainable initiatives within big business.

Other driving forces will come from the state-owned funding institutions and Development Finance Institutions (DFIs) creating an environment of low interest loans, other finance options at competitive rates and grants to assist with feasibility studies, energy audits and technical assistance. The relaxation of lending criteria is linked to cash flows, collateral based lending or a combination of both. The improving knowledge and skills development within Financial Institutions (FIs) will assist in FI organisations appraising ESCO projects more efficiently.

Even with the Medupi and Kusile power stations likely to come online in 2014, the demand for electricity will continue to increase and the spare capacity within the electricity distribution network will be stretched. As long
as the cost of building capacity is significantly higher than the cost of saving energy, the market will continue to flourish.

The Power Conservation Programme (PCP) and the Energy Conservation Scheme (ECS) have been mooted by Eskom since 2009. These programmes target the top 500 customers – in particular the top 33 electricity users making up 44% of the country’s demand – and in effect ‘encourage’ them to reduce their consumption by at least 15%, failing which punitive tariffs of up to R9/kWh would come into effect. These programmes have not yet been launched, but should the supply shortage remain serious (which is highly likely), they can be implemented rapidly. This will provide opportunities particularly to the larger ESCOs to provide services to these clients as they try to achieve the required targets.

The price of electricity is expected to increase above inflation for the foreseeable future, and will motivate many individuals, businesses, government and industry to implement energy efficiency projects.

International experience (as observed in the more mature markets like the USA, Canada and the UK) shows that as the ESCO industry matures and the skills base becomes more experienced and knowledgeable, the trust from big business and confidence in the ESCO model will improve.

**Which technologies will assist growth in the ESCO market?**

Eskom’s long-term targets indicate the types of energy efficiency technologies that are expected to make up the bulk of the energy savings over the next eight years. From 2014, SWH will be the most significant, with almost 50% expected to come from the installation of SWH.

Savings through heat pumps will make up a seventh of the energy saving and be the second largest energy efficiency saving technology of the next few years.

Lighting and HVAC, which was the largest contributor to energy saving in the last decade in South Africa, is only expected to contribute about 7% of Eskom’s long term target savings.

**Table 3 - Targeted savings by technology from 2011 to 2020**

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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting and HVAC</td>
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<td>32</td>
<td>32</td>
<td>30</td>
<td>34</td>
<td>38</td>
<td>44</td>
<td>24</td>
<td>24</td>
<td>27</td>
<td>390</td>
</tr>
<tr>
<td>Solar Water Heating (SWH)</td>
<td>26</td>
<td>52</td>
<td>46</td>
<td>164</td>
<td>269</td>
<td>354</td>
<td>427</td>
<td>446</td>
<td>359</td>
<td>359</td>
<td>2501</td>
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<tr>
<td>Heat Pumps</td>
<td>3</td>
<td>32</td>
<td>75</td>
<td>172</td>
<td>181</td>
<td>59</td>
<td>68</td>
<td>62</td>
<td>75</td>
<td>77</td>
<td>804</td>
</tr>
<tr>
<td>(1) Demand Reduction</td>
<td>47</td>
<td>71</td>
<td>144</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>262</td>
</tr>
<tr>
<td>Compressed Air</td>
<td>39</td>
<td>37</td>
<td>39</td>
<td>36</td>
<td>60</td>
<td>64</td>
<td>44</td>
<td>64</td>
<td>70</td>
<td>106</td>
<td>559</td>
</tr>
<tr>
<td>(2) Industrial Process Optimisation</td>
<td>81</td>
<td>70</td>
<td>59</td>
<td>83</td>
<td>91</td>
<td>83</td>
<td>96</td>
<td>48</td>
<td>43</td>
<td>39</td>
<td>693</td>
</tr>
<tr>
<td>Shower Heads</td>
<td>0</td>
<td>20</td>
<td>65</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>85</td>
</tr>
<tr>
<td>(3) New and Other Initiatives</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>17</td>
<td>21</td>
<td>30</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>44</td>
<td>208</td>
</tr>
<tr>
<td>Total MW</td>
<td>301</td>
<td>313</td>
<td>459</td>
<td>502</td>
<td>656</td>
<td>628</td>
<td>711</td>
<td>676</td>
<td>603</td>
<td>652</td>
<td>5500</td>
</tr>
</tbody>
</table>

Eskom Funding Will require a change to policy and standards (Eskom)

(1) Demand reduction refers to water control systems such as ripple control, radio controlled transmitters and agricultural pumping projects
(2) Industrial Process Optimisation Motor efficiency, variable speed drives, fans/pumps
(3) New and other initiatives include Agricultural initiatives, infra red heating and domestic cooking

Source: Eskom 2012
Assessing the market potential

It is therefore clear that potential energy efficiency savings could be achieved and that there is significant potential in the EE, and consequently the ESCO market. However, the information available is not sufficiently detailed or complete to make an accurate, scientifically based estimate of this market potential in South Africa. In an attempt to confirm the widely-held belief that the ESCO industry presents significant growth and revenue generation opportunities, a market potential estimate based on the targeted energy savings was made using the follow assumptions:

- The Government target of 12% savings is achieved.
- 2011 Peak demand (obtained from the MYPD) is a suitable basis for calculating possible savings (slightly higher than the 5,500 indicated in figure 4 above).
- Total energy saved is calculated on a load factor of 50%.
- Energy costs are assumed to be R1 per kWh, and they do not increase over the estimation time horizon. In practice energy costs will increase over time, but a fixed cost was assumed to ensure a conservative market potential assessment.

The market potential for ESCOs would be dependent on the level of market penetration that they are able to achieve. This is influenced by a number of factors, including their own capacity and skills, the removal of the barriers and the extent to which energy users will attempt to achieve savings without the help of ESCOs. As a result, a calculation of the market potential for ESCOs assumes a low (10%), medium (20%) and high (30%) market penetration as follows:

<table>
<thead>
<tr>
<th>ESCO market penetration</th>
<th>Low – 10%</th>
<th>Medium – 20%</th>
<th>High – 30%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential demand reduction</td>
<td>6 000 MW</td>
<td>6 000 MW</td>
<td>6 000 MW</td>
</tr>
<tr>
<td>Load factor (x 50%)</td>
<td>50%</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Energy saved (GWh)</td>
<td>26 million</td>
<td>26 million</td>
<td>26 million</td>
</tr>
<tr>
<td>Cost per kWh</td>
<td>R1</td>
<td>R1</td>
<td>R1</td>
</tr>
<tr>
<td>Market potential over ten years</td>
<td>R2.6 billion</td>
<td>R5.2 billion</td>
<td>R7.8 billion</td>
</tr>
</tbody>
</table>

It should be understood that the estimate provided above is based on a number of assumptions, and was calculated at a macro level. It is indicative only and can therefore not be relied upon for detailed planning purposes. It is however a ball-park indicator of market potential. The estimate also assumes that an EPC model is applied where the achieved savings are shared between the ESCO and the end user, and excludes the profit that ESCOs can realise through the sale of equipment. The range of market penetration recognises that ESCOs will not be involved in all energy efficiency initiatives, and that even when they are involved, their level of involvement and therefore market penetration will vary.

4. The concept of Energy Service Companies

Definition, scope and classification

An ESCO is a company that provides energy services like energy audits, energy management, and energy or equipment supply, provision of services such as space heating (Bertoldi and Rezessy 2005). They usually offer the following services:

- development
- design
- finance energy efficiency projects
- install and maintain the energy efficient equipment
measure, monitor, and verify the project’s energy savings. and
assume the risk involved in the expected amount of energy savings.

They can be consulting firms or equipment contractors willing to take financial, technical and other risks (Bertoldi et al 2006) through the concept of performance based contracting, which means that the ESCO’s payment is directly linked to the amount of energy saved (in physical or monetary terms). ESCOs have been classified in several ways in the literature depending on their origin, target customers and type of services, etc. ESCO markets in the developing countries generally adopt the following classification (Shippee 1996):

- **Vendor ESCOs** are equipment manufacturers and generally do not operate in the utility driven DSM industry and tend to focus on large industrial clients.
- **Utility ESCOs** bid to serve as providers for utility funded DSM programs and are paid based on electricity savings.
- **Contractor ESCOs** typically work with contractors in green field construction projects by installing more energy efficient equipment than what might have been provided otherwise.
- **Engineering ESCOs** perform design and other services but are seldom involved in performance contracts.

**Funding and business models**

ESCOs are typically compensated for their services based upon performance contracts. By implication, this means that ESCOs must find ways to fund upfront costs associated with the services they offer. This financing of equipment/technology and other essential services can either be provided by the ESCO from its internal funds (ESCO financing), or by the customer backed by a savings guarantee from the ESCO (end user/customer financing). Another possibility is third party funding (TPF), in which a financial institution provides credit either to the ESCO or directly to its client backed by a guarantee for the projected energy or cost savings given by the ESCO (Bertoldi and Rezessy 2005).

There are different models for energy performance contracting: shared and guaranteed savings model. Under the shared savings model the cost savings are shared by the ESCO and the client at a pre-determined percentage for a fixed number of years. In this model, the ESCO guarantees a certain level of cost savings to the customer whereas in the guaranteed savings model, the ESCO guarantees a certain level of energy savings to the customer (Bertoldi and Rezessy 2005). In the latter model, the ESCO assumes the performance risk, but usually not the credit risk, since the customer has to provide funding himself (from his own funds or from banks). This model is therefore based on end user or third party financing. It has the advantage that interest rates are usually much lower and therefore more energy efficiency investment is possible. In contrast, in the shared savings model, the ESCO assumes both the performance and the credit risk.

**Figure 3: Shared and Guaranteed saving models**

Source Taylor et al 2008
### Table 5: A comparison between the Guaranteed and Shared saving funding mechanisms

<table>
<thead>
<tr>
<th>Guarantees savings</th>
<th>Shared savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance related to level of energy saved</td>
<td>Performance related to cost of energy saved</td>
</tr>
<tr>
<td>Value of energy saved is guaranteed to meet debt service obligation down to floor price</td>
<td>Value of payment is linked to energy price</td>
</tr>
<tr>
<td>ESCO carries performance risk and energy – user/customer carries credit risk</td>
<td>ESCO carries performance and credit risk as it typically carries out the financing</td>
</tr>
<tr>
<td>If the energy-user/customer borrows, then the debt appears on the balance sheet</td>
<td>Usually off balance sheet of energy user/customer</td>
</tr>
<tr>
<td>Requires creditworthy customer</td>
<td>Can serve customers that do not have access to financing, but still requires a creditworthy customer</td>
</tr>
<tr>
<td>Extensive measurement and verification (M&amp;V)</td>
<td>Extensive measurement and verification (M&amp;V)</td>
</tr>
<tr>
<td>ESCO can do more projects without getting highly geared</td>
<td>Favours large ESCOs, small ESCOs become too leveraged to do more projects</td>
</tr>
<tr>
<td>More comprehensive project scope due to lower financing</td>
<td>Favours projects with short payback due to higher financing costs</td>
</tr>
</tbody>
</table>

Source: Bertoldi & Rezessy, 2005

The third method (termed Chauffage or Energy Supply Contracting) involves the sale of the energy service itself, i.e. lighting, heating, cooling etc. In this case the ESCO not only takes on the cost of investment, but also the responsibility for maintenance and operations, providing support for the life of the concession. One of the key differences in this model as compared to the other two models is that the payment to ESCO is not contractually linked to savings.

**Performance guarantees/contracts**

A key enabling feature of the ESCO industry is the use of performance guarantees and contracts. Payments to the ESCOs are based on the actual energy saving achieved from the energy efficiency project implemented. The contract has an energy savings performance guarantee over the length of the contract. If there is a shortfall in the actual energy savings, then the percentage shortfall is deducted from the energy saving income. If the energy savings exceed the target, then the benefit will be shared between the ESCO and the client on a pre-determined rate.

One of the advantages of EPC contracts is that the customer can outsource the entire project to an ESCO from initiation, assessment, development, financing and monitoring. The ESCO is then paid for the project management and other functions it performs in the value chain of an EPC. In principle, customers can have off-balance financing that will pay for the project through energy savings. A major advantage is that customers can fund the project over time and can do so with very little or no discretionary budgets and at a relatively low risk.

**Figure 4: EPC and operational costs**

The EPC will lower operational and maintenance (O&M) costs with the ESCO related costs financed by savings. The other portion of the savings is shared by the ESCO and the customer in a pre-determined portion as defined in the EPC contract. The contract will have a finite life span whereby both the ESCO and client are incentivised to maximise energy savings and therefore maximise revenue to the ESCO and reduce costs to the client. The client is also guaranteed a minimum level of savings.
The benefits of EPC contracts are summarised below:

- EPCs can assist in reducing transaction costs and offer a full or partial package of services that assume project performance risks.
- EPCs can assist in better defining the costs and benefits of a project upfront.
- EPCs provide an easy and understandable energy efficiency assessment that the FI can utilize when assessing projects and thus reduce time for approval.
- High perceived risk from new technology by the client and FIs can be included in EPCs guaranteeing performance, thus assigning the project risks to the ESCO.
- Assist with Government/Municipal inflexible procurement processes – Projects can be easily designed so that they can meet local procurement rules and regulations and reduce red tape.
- EPC contracts could allow for the annual budget constraints to be overcome by providing a mechanism whereby payment is based on savings and payment deferred to match these savings. The project can be implemented with no or very small discretionary budgets and at a relatively low risk to the client.
- EPCs are a good method to allow for bundling of projects and the reduction of relative high administrative costs, as well as enabling risk to be spread over a wider range of technologies, building, and product offerings.
- EPC technical skills section would provide an area where end-users could compare ESCO competent skills, qualification and experience.
- Comparability of tender bids, especially in regards to Municipal and Government contracts, ensures that all bidders are easily evaluated.
- The standardisation of EPCs will provide an environment that reduces the mistrust of the ESCO industry within South Africa by providing simplified and understandable contracts for ESCOs, clients, end-users, FIs and all relevant stakeholders.
- Standardised EPCs will reduce administration costs by streamlining the whole process, thus using up less of the ESCO’s precious manpower resources on administrative duties.

5. **Global developments in the ESCO market**

To gain an understanding of best practices to be implemented into the South African ESCO industry, an international benchmarking study was performed on ten countries. The understanding of the global ESCO market development study was on countries that ranged from an immature market like South Africa, to the most developed market of the USA.

The study examined the history of ESCO development, the size and scope of the industry worldwide, the barriers and the enablers that have succeeded in helping to develop the industry internationally. The table on pages 21-23 summarises the financial instruments, institutional arrangements, barriers and enablers for each country.

There have been a large number of studies internationally to understand the reasons why ESCOs worldwide are not necessarily developing to their fullest potential.

![Figure 5: Seven critical categories for development](chart)
The various barriers identified and discussed in the literature may be grouped into seven different categories critical to the development of any emerging industry and are further discussed briefly below to provide a better understanding of the context and nature of the impacts that prevail with the barriers.

1. **Low awareness and lack of information** about the ESCO concept was considered the most important barrier to the widespread use of ESCO services. The limited understanding of ESCO services within banks and other Financial Institutions (FIs) remains as the most pressing obstacle to the ESCO market expansion in many countries like India, China and Brazil, where the industry is still in its emerging phase. The potential clients are generally not aware of ESCO solutions and energy efficiency technologies and/or lack awareness because their attention is on their core business and energy constitutes a small part of their expenses. Furthermore, large energy users usually have in-house expertise and do not see the need for ESCO services.

2. **Financing and resources**: The following problems (together with the availability of financing that matches the specifics of energy efficiency projects) have been consistently stated by many experts across the globe:
   
   a. High pre-investment development and transaction costs, partially due to small size of projects, especially in the SME market.
   
   b. Lack of visibility and scale of energy efficiency finance; energy efficiency projects often represent a relatively small niche business for major banks.
   
   c. High credit risks (perceived): The financial products offered are not advantageous but often expensive, limiting the availability of good offers for the ESCO industry.
   
   d. Lending is generally asset-based. In asset-based lending the bank requires collateral and energy efficiency projects usually lack high-value collateral. Collateral value is low because for most energy efficiency projects, equipment represents a sizeable share of total project cost with high portions of engineering, development and installation costs. Apart from this, energy efficiency equipment is highly specific to a certain site or application. High asset specificity implies illiquidity of certain investments, which leads to higher interest rates being required by investors in those investments. Basically, once equipment is installed, the asset value is drastically diminished due to the limited resale/reuse value of energy efficiency equipment and costs involved to recover assets from end users.
   
   e. The small size of ESCOs in many countries has further complicated this barrier and there is often a considerable risk perceived for lending directly to the ESCOs. Energy savings as revenue is ignored by financiers: cash flows from saving energy are not (yet) conventional revenues in what is still an asset-based culture in financing. This discourages commercial FIs' entry into this market. Energy cost savings should be incorporated into lenders' analysis of free cash flow and ability of borrowers and end-users to meet debt service payments.
   
   f. Another major risk perceived with cash flow based lending is the realistic assessment of energy savings. The banks perceive huge commitment risks as a result of information asymmetry between the ESCOs and banks. The intangible nature of the revenues from energy savings that is hidden in the energy cost of the facility of the beneficiary will compliment this risk by restricting the ability for ensuring an effective repayment mechanism that is critical for lending institutions.

3. **Absence of strong legal, policy and regulatory frameworks**: The ESCO industry, especially in the emerging markets like India, China and Brazil, has continuously lobbied for favourable policies and incentives to trigger large-scale investments in EPC based projects. Many countries have failed to develop a strong legal framework to safeguard contracts or indemnify a breach in contracts. This barrier has further deprived the trust and confidence in ESCO services offered by many companies. One of the major bottlenecks today is the lack of accountability and general data to make informed decisions by the policy makers. Lack of reliable energy consumption data makes it even more difficult to establish baseline and hence provide reliable data on actual savings.

Ambiguities in the legislative framework, including the public procurement rules, remain one of the most important barriers in many countries like India, China, Brazil, Japan, Germany and Italy. Procurement procedures are often complex and time consuming, which adds up to the transaction costs of projects, undermining their viability. In some jurisdictions, the public tendering regulations require the applicants to
have experience in all relevant project specific sectors, which hinders the entry of new and less established market actors. Moreover, in most countries lifecycle costs that also account for maintenance and energy costs are not used in public procurement which poses a disadvantage to EPC projects that may have a higher initial investment cost.

4. **Administrative hurdles and high transaction costs** limit the willingness of ESCOs, end-users and FIs to participate in energy efficiency projects. Small project sizes will further limit the clients’ interest and weaken the project economics. Project sponsors, especially in small and medium scale enterprises, may have difficulties in meeting the cost of energy audits or find it too risky to commission energy audits. In many countries these barriers are still serious, but many have started to pool projects, which decreases both risk and transaction costs. The transaction costs associated with investments in energy efficiency, such as the acquisition of information or the risks associated with investments in new technologies, are high in the market and substantially inhibit such investments. Lack of accreditation of ESCOs and standardization of tender documents and EPCs have also increased the transaction costs alarmingly in many countries across the world.

5. **Trust and scepticism:** The lack of trust and scope for scepticism on the clients’ side of the ESCO offer is another long standing obstacle that has not changed significantly in many countries. This is often the result of limited understanding of energy efficiency opportunities and also the energy savings estimated in the feasibility reports often prepared by third party agencies. The credibility of these agencies and also the data used for estimating the energy savings are often the major challenges. This also leads to a complex structuring of the EPCs with many safeguards to both the parties. In many of the developing countries, this is particularly an issue because of over suspiciousness in EPC offers on the side of clients, who often suspect that there is a piece in the contract that will make the agreement unfavourable for them. Some of the clients are afraid that the guarantee would not function as expected. Apart from this, there is a high level of aversion to outsource energy management tasks and allowing an outsider (the ESCO) to intervene in common practices and/or change equipment that the users are used to. In addition, the resistance is even higher when an intervention would affect the core business. In the industrial sector, the client may be reserved in allowing the ESCOs in its processes and sometimes fear for data or patent protection may be the reason. In the public sector there is a fear of layoff if energy management is outsourced.

6. **Lack of effective measurement & verification (M&V) protocols and standards:** Limited understanding of the established M&V protocols is one the major barriers for structuring the EPCs in many countries. Poor standards often lead to frequent disputes between the ESCO and the beneficiary. The development of a proper, neutral and reliable standard is believed to have the potential to significantly add to the success of the EPC market in almost all countries.

7. **External factors**
   
i. **Split incentives** are still extremely important and considered a major challenge in the building and the public sector. An example is the ‘renter-owner’ division; the tenants pay the energy bills, but the landlord is responsible for renovations because he controls the property. Neither side has the incentive to invest in energy saving equipment because the owner would have to bear the costs, while the savings would appear on the tenants’ bills. On the other hand, the tenant can never be sure whether he/she will use the property long enough to recover the investment. However, the significance of this barrier in the industrial and commerce segments is very low.

   ii. **Low and fluctuating energy prices** decrease the economic potential for energy savings.

   iii. **The financial crisis and economic downturn** has made access to finance more difficult in many of the countries today in Europe. The financial crisis has influenced the initiation and development of projects due to the tighter access to loans, higher interest rates, stronger securities needed, reduced investment budget of clients, higher insolvency risk of clients and reduced the availability of providers to engage in long-term contracts. In some countries, the economic crisis led to a freeze in refurbishment and upgrading investments; blocking a number of projects under development and the initiation of new ones.
iv. **Tariffs** do not always represent the real cost of energy as certain users are subsidized, especially those whose volume of use increases as the cost per kWh decreases. In other cases, due to the high volume of energy utilized by the industry, the cost of energy purchased is low and energy efficiency measures are therefore not pursued.

v. **Selling cogeneration power** is another problem in that industries that produce excess heat and other sources of power have no regulation or mechanism in which to sell their possible cogeneration units back onto the grid.

**Enabling/success factors for the development of an ESCO industry**

The ESCO industry worldwide is a very niche segment and only a few countries can boast of a fully developed ESCO industry. The long history of ESCOs in certain countries is the result of various enabling factors and/or the ability of the market to overcome the most important barriers. Many of these factors may have contributed to intended or unconscious facilitation of the development of ESCO markets.

The number of policies and actions set up with the objective of directly supporting the ESCO market are limited. However, a number of legislative, structural and market related changes have fostered the growth of national ESCO markets in many countries by producing indirect effects on the supply and demand for energy efficiency. The USA, Germany, UK and Canada are the select few that have a fully matured ESCO industry. Other countries like China, India, Brazil, Italy, Japan and Australia are in the process of market transformation by initiating several programs, schemes and incentives for ESCOs. The following table presents some of the common best practices adopted across the world for successful promotion of ESCO services.

**Table 6: Summary of international best practices**

<table>
<thead>
<tr>
<th>No</th>
<th>Initiative</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Innovative risk sharing and transfer mechanisms</td>
<td>USA, Canada, China, Brazil, Germany, India</td>
</tr>
<tr>
<td>2</td>
<td>Demonstration of pilot projects/savings/EPC</td>
<td>USA, Canada, India, China, Italy</td>
</tr>
<tr>
<td>3</td>
<td>National ESCO association</td>
<td>USA, Canada, Brazil, China, Japan, UK, Italy, Australia</td>
</tr>
<tr>
<td>4</td>
<td>Formation of Super ESCO</td>
<td>India, China, Germany, Italy, Canada</td>
</tr>
<tr>
<td>5</td>
<td>Demand Aggregation/Project Bundling</td>
<td>USA, Canada, India, China, Japan, Germany, Italy, Australia, Brazil</td>
</tr>
<tr>
<td>6</td>
<td>Accreditation of ESCOs and standardisation of services</td>
<td>USA, UK, China, Australia, Brazil</td>
</tr>
<tr>
<td>7</td>
<td>Energy Efficient public procurement and mandatory targets</td>
<td>Italy, Germany and UK</td>
</tr>
</tbody>
</table>

Leading from the front are government agencies with demonstration projects highlighting the potential savings and the benefits of ESCO based energy efficiency projects. Reasonable payback from these demonstration projects can help strengthen the trust between the clients and the ESCOs.

The biggest challenge faced by the ESCO industry however is their inability to secure financing to implement the energy efficiency measures. Several risk sharing and transfer mechanisms have been adopted worldwide to secure loans against defaults. A further impetus is provided to ESCOs in many parts of the world by giving financial incentives like tax rebates, capital subsidy, low interest rates and other secondary sources of revenues (like white certificates) to promote commercially attractive investments. The growth of the ESCO industry worldwide is facilitated by the formation of ESCO associations that will lobby for the interests of the industry.

**Innovative risk sharing and transfer mechanisms**

There is a wide range of instruments that can be employed to promote the access of ESCOs to financing, thereby lowering the cost of financing and enabling more comprehensive energy efficiency project development. A guarantee scheme or other risk mitigating tools may be appropriate when the financing sector perceives that the risk of ESCO projects is too high. Subordinated debt or mezzanine financing may also be
explored to reduce the amount of senior debt and close an existing equity gap. The risk sharing and innovative methods that have been successfully in developing energy efficiency and the ESCO market internationally are discussed below:

**Credit guarantee products**

Credit Guarantees are contracts interlocking three parties – lender, borrower and the guarantor. Typical guarantee structures include pari passu agreements with primary lenders, partial guarantees, subordinated recovery guarantees, portfolio first loss and second loss guarantees, pro rata loss basis, loss reserves acting like first loss guarantees, and liquidity support guarantees. The partial credit guarantees (PCGs) would partially cover any default of scheduled repayments of principal and accrued interest.

Depending on the degree of the guarantor's involvement in the loan approval process, there are individual guarantees and portfolio guarantees. In an individual guarantee scheme, the guarantor is heavily involved in each individual transaction, appraising the eligibility of the applicant borrower for the guarantee in line with the primary lender's due diligence to establish eligibility for a loan. A portfolio guarantee guarantees all loans by the primary lender to a class of borrowers.

Credit guarantee projects have been particularly successful in Hungary and China where DFIs have provided guarantees to the local FIs, who are then willing to provide commercial loans to the ESCOs (risk profile decreased) thus increase finance availability to ESCOs.

**Take-out financing**

Take-out financing is a globally adopted method of providing finance for longer duration projects (say of ten years) by banks by sanctioning medium-term loans (say 4-6 years). It is an arrangement where the loans will be taken out of the books of the financing bank, within pre-fixed period, by another institution, thus preventing any possible asset-liability mismatch. After taking out the loans from the banks, the institution could off-load them to another bank or keep it.

The major benefit derived from this instrument is that it ensures that the project with unusually long payback periods gets long-term funding through various participants.

**Preferred Drawing Rights and Energy Savings Insurance**

A Preferred Drawing Rights agreement or provision is included in the loan documentation, whereby the borrower agrees that the lender is paid automatically at a defined payment date for each payment period (monthly, quarterly), and this amount is automatically withdrawn from the borrower's primary bank account.

Energy Savings Insurance (ESI) is a formal insurance contract between an insurer and either the building owner, or third-party provider of energy services. In exchange for a premium, the insurer agrees to pay any shortfall in energy savings below a pre-agreed baseline, less a deductible.

The guaranteed payment of drawing rights and ESIs can reduce the net cost of energy-saving projects by reducing the interest rates charged by lenders, and by increasing the level of savings through quality control.

**Forfeiting**

Forfeiting is a form of transfer of future receivables from one party (cessionary – an ESCO) to another (buyer – a FI). The original creditor (the ESCO) cedes his claims and the new creditor (the FI) gains the right to claim future receivables from the debtor (the client). The ESCO sells future receivables to an FI in return for a discounted one-time payment. A cession of future receivables is not a stand-alone financing option, but can serve as additional collateral for the FI.

**On Bill Financing (OBF)**

OBF generally refers to a financial instrument that is serviced by or in partnership with a utility company for energy efficiency improvements and repaid by the customer on its monthly utility bill. Integrating loan payments
with energy bills and allowing utilities to cut off energy supply to defaulting customers has the potential to both lower collection costs and enhance credit quality of the financing scheme, thereby lowering financing costs. Payment via utility bill reduces the risk of credit default and lowers collection risk.

Financing can be extended to historically undeserved markets by being structured as a service charge that follows the meter. This instrument may also gain access to finance for credit constrained customers through modified underwriting that takes bill payment history into account and thus provides the ESCOs to a greater potential client base.

Establishing bankable ESCO project pipelines/Demonstration projects

An appropriate mechanism for project development and delivery is instrumental in generating a steady flow of investment ready projects. The tools available for ensuring bankable ESCO projects are as follows:

- targeted communication about the profitability of energy efficiency investments, and
- programmes and technical assistance facilities that build the capacities of market participants to develop and structure finance for projects, most notably providing training for feasibility study and business plan preparation across a range of possible project proponents.

Demonstration project and bankable reports studying the technical feasibility, project economics and other critical parameters create an environment that can unleash significant replication potential across local municipalities, and cities once successful implementation can be proven as noted in countries such as India.

Establishment of national ESCO associations

An ESCO association can act as a reference point for the end users and suppliers and, by grouping and concentration of ESCO professionals, can represent the point of view of the industry with a unified voice. In addition, the establishment of an association can concentrate resources for information dissemination and capacity building. The association can create a support network for potential clients with capacity building, provide direct advice, and access to information to promote the development of the ESCO industry.

Establishment of Super ESCO

A Super ESCO is an entity that is established by the Government, serves as an ESCO for the large untapped public sector, supports capacity development and activities of other ESCOs and facilitates access to project financing. There are a number of Super ESCO models that slightly differ from one another, however the main advantages to ESCOs is skills development, promotion of energy efficiency, financing leverage and access to a generally untapped Public sector market.

Demand aggregation/Project bundling/Pooling

Demand aggregation through bundled Multi-state DSM programmes (MSDP) in India has been identified as one of the most promising solutions to overcome the barriers of market transformation. Project bundling allows for the aggregation of individual projects, technologies, service offers, and investments into larger and more comprehensive lots to achieve sufficient economies of scale. A framework should be integrated with mandatory domestic manufacturing for further scope of reducing the costs. These measures subsequently motivate the manufacturers to re-assess their market size, investments and potential revenues.

Accreditation and standardisation

Accreditation of ESCOs has been referred to as one of the most effective tools to increase trust in the quality of ESCO work. The establishment of a national legal framework for the identification and the establishment of quality standards and certification schemes for ESCOs may be essential to boost the ESCO markets and improve confidence in the end users. This will include the standardisation of common core contractual provisions; including clear project evaluation frameworks, definitions, measurement and verification standards (i.e. such as the International Performance Measurement and Verification Protocol).
Many countries have developed standardized templates for tender documents and contracts that give a successful procedure protocol for carrying out parts or all of the ESCO operations. Templates and protocols are usually useful for embryonic markets and for building trust in the ESCO business in general, because these documents are produced by a neutral body, such as an energy agency or a NGO.

**Focused Governmental policy and legislation for energy efficient public procurement and mandatory targets**

It is essential to have a sound legislative framework that enables ESCO type projects, policies and measures that promote energy efficiency investments. In order to promote ESCO projects in the public sector, a number of important steps are necessary. Firstly, adaptation of the public procurement laws is required in order to facilitate the evaluation of EPC providers and adapting the project cost evaluations in order to take into consideration lifecycle costs, including maintenance and energy costs. Secondly, the inclusion of energy efficiency in technical tender specifications and use of lifecycle costing in public tender specifications should be allowed. Clear, practical and ready-to-use guidelines on how to apply energy efficiency criteria in public procurement procedures are needed in order to improve the practical implementation of energy efficient public procurement. A favourable policy and regulatory framework with mandatory energy efficiency targets can create demand for energy audits and energy efficiency investments and raise the awareness of energy efficiency measures, lowering investment risks and thus allow for ESCO market development.

**External factors**

**Energy prices** have been going up significantly in almost all countries as a result of resource shortages, stricter environmental regulations, and/or the removal or rationalization of subsidies. This has significantly increased interest in energy efficiency and EPC, because energy use is more and more expensive and consumers are now being forced to revise their energy spending. High energy costs ensure the profitability of investing in energy saving for both the customer and the ESCO. It has been highlighted in Europe for instance, that ESCOs work primarily with industries whose energy costs represent a large share of their expenditures. Many countries in Europe have initiated energy taxes as part of the drive for the development of clean energy sources. Some ESCOs consider energy taxes as one of the most effective political measures for the promotion of energy efficiency. (However, a sharp increase in the price of gas can have a dramatic effect on CHP investments and decrease or erode its profitability).

**Liberalization** has unclear effects on the ESCO market. On the one hand, competition has pushed prices down (especially in the case of electricity), thus decreasing the incentive to save energy. In Germany for instance, energy prices dropped significantly between 1999 and 2001 as a result of liberalization. On the other hand, competition stimulates new services being offered by the energy utilities. In the US, as a result of market opening, many utilities and energy suppliers have opened new business areas, including ESCO servicing. Among many others, the British energy facilities also offer energy services in order to attract more customers or keep old ones.

**Climate change politics** – The growing success of ESCOs that deliver carbon savings for obliged parties and/or obliged nation states, is also largely due to the increased climate consciousness, the increasing level of obligations related to Climate Change Politics. Under the Kyoto Protocol, the European Union is committed to reducing GHG emissions by 8% between 2008 and 2012 relative to 1990 levels. In addition, the EU established obligations for its Member States towards more rational use of energy.

**Summary of barriers and enabling factors**

<table>
<thead>
<tr>
<th>No</th>
<th>Country</th>
<th>Financial instruments</th>
<th>Institutional arrangement</th>
<th>Barriers</th>
<th>Enabling factors</th>
</tr>
</thead>
</table>
| 1  | USA     | • Low and tax free interest rates to pay for energy efficiency measures.  
• Rate payer funded | • National Association of Energy Service Companies (NAESCO)  
• US Department of Energy (DoE) | • Reluctance of industrial consumers to change core processes.  
• Aversion to off balance sheet financing and long and lengthy process in the public | • Mandating utilities to achieve savings.  
• Financial instruments like tax rebates, interest rebates etc.  
• Federal buildings |
<table>
<thead>
<tr>
<th>No</th>
<th>Country</th>
<th>Financial instruments</th>
<th>Institutional arrangement</th>
<th>Barriers</th>
<th>Enabling factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Japan</td>
<td>• Accelerated depreciation of energy efficiency equipment</td>
<td>• Office of Energy Efficiency and Renewable Energy (EERE)</td>
<td>sector.</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Brazil</td>
<td>• PROCEL program – part or full funding provided to implement energy efficiency measures in government sector. • PROESCO – guarantee for ESCO loans • Wire charge on utilities to fund energy efficiency initiatives</td>
<td>• ANEEL – Electricity regulatory body. • ABESCO – Brazilian association of ESCOs</td>
<td>• Lack of private funding • Credit worthiness of ESCOs • Lack of awareness • Shift in government policies from energy efficiency to R&amp;D</td>
<td>• Large saving potential • Government initiatives (PROCEL, PROESCO etc.)</td>
</tr>
<tr>
<td>3</td>
<td>India</td>
<td>• Accelerated depreciation on equipment. • State Energy Conservation Fund • Creation of a PRGF to provide guarantee to ESCO lending.</td>
<td>• Bureau of Energy Efficiency (BEE) – look after energy efficiency in the country. • Energy Efficiency Services Limited (EESL)</td>
<td>• Lack of credit worthiness of the ESCO • Non availability of financing for ESCO projects. • Lack of technical capabilities of the ESCO and the client. • Public procurement procedures. • Lack of standardized documents.</td>
<td>• Tax incentives and demonstration projects. • Resources to prepare bankable DPRs • Financial support through banks. • International support from multilateral and bilateral banks. • Statutory bodies to promote EE</td>
</tr>
<tr>
<td>4</td>
<td>China</td>
<td>• World Bank/GEF loan guarantee program</td>
<td>• NDRC – to promote ESCOs in China • EMCA – ESCO association</td>
<td>• Small size of ESCO inability of securing a loan • Lack of standardized documents. • Government procurement procedures. • Unavailability of credit</td>
<td>• International support (WB GEF program) • Mandatory regulations to implement energy efficiency measures.</td>
</tr>
<tr>
<td>5</td>
<td>Germany</td>
<td>• Securing financial risks by public funding</td>
<td>• BEA – Berlin Energy Agency • German Energy Agency • Various other institutes at local levels.</td>
<td>• Industries are not interested in changing core processes • EE is paid for by the operating fund, while the benefit is realised in the net revenue, hence, energy savings from one measure cannot be used further to finance other energy efficiency projects. • Government officials are apprehensive of losing their jobs to external contractors.</td>
<td>• Bundling of municipalities to achieve economies of scale • PICO scheme • Standardization of EPC contracts</td>
</tr>
<tr>
<td>6</td>
<td>Australia</td>
<td>• Green Investment Tax Deduction • Subsidy on equipment purchase</td>
<td>• Australia Energy Performance Contracting Association (AEPCA) • SEDA – Sustainable Energy Development Agency</td>
<td>• No government support, no national targets set for energy efficiency. • Perception that improvements in core process would yield more results than energy efficiency improvements. • Lack of highlights for energy efficiency measures.</td>
<td>• Formation of AEPCA • Formation of a National Framework for Energy Efficiency (NFEE) • Building codes and star rating for buildings.</td>
</tr>
<tr>
<td>7</td>
<td>Japan</td>
<td>• JAEESCO – Japanese Association of Energy Service Companies • METI – Ministry of Economy, Trade and Industry</td>
<td>• No government support, no national targets set for energy efficiency. • Perception that improvements in core process would yield more results than energy efficiency improvements. • Lack of highlights for energy efficiency measures.</td>
<td>• No government support, no national targets set for energy efficiency. • Perception that improvements in core process would yield more results than energy efficiency improvements. • Lack of highlights for energy efficiency measures.</td>
<td>• Green Investment Tax Deduction scheme launched in 2010. • METI’s scheme of providing subsidies on purchase of equipment. • Accreditation of ESCOs by JAEESCO and various capacity building programs.</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>No</th>
<th>Country</th>
<th>Financial instruments</th>
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<th>Enabling factors</th>
</tr>
</thead>
</table>
| 8  | Canada  | • Natural Resources Canada – government of Canada department looking after energy efficiency  
    • CAESCO – Canadian Association of Energy Service Companies  
    • Canertec – Canadian national ESCO | • Ownership in residential sector – especially in the rented properties  
• Economies of scale.  
• Complex approval process | • GEPP and Federal buildings initiatives by the government.  
• Accreditation of ESCOs by CAESCO. |
| 9  | UK      | • Energy Services and Technology Association (ESTA) | • Length of ESCO contracts  
• Economies of scale  
• Lack of standardized contracts and documents | • Success of Private Funding Initiative  
• Programs like the Energy Efficiency Commitment (EEC) |
| 10 | Italy   | • White certificates trading  
• PICO arrangement | • ASSOESCo – Association of ESCOs  
• AEEG – Regulatory body  
• AGESI – ESCO association | • Public procurement process.  
• Creditworthiness of ESCOs  
• Financing | • Mandatory targets for Utilities  
• The White certificate scheme  
• PICO scheme  
• Accreditation of ESCOs |

6. The South African ESCO Industry

ESCOs as designated implementation vehicles for energy efficiency projects are very important to South Africa. The first ESCOs in South Africa came into existence only in the late 1990s when Eskom formally recognized the importance of DSM in its Integrated Electricity Planning. The ESCO Industry in South Africa has been active in four major sectors; namely the Residential and Municipalities, Mining and Industrial, Corporate and Commercial and Agriculture. In 2001, the total size of the industry was R100 million. The industry has witnessed enormous growth since the formal establishment of Eskom DSM fund in 2002. The market in South Africa is still in its infancy and thus can learn lessons from other international markets.

Eskom has established an IDM division which is dedicated to ensuring short-term security of electricity supply through coordinating and consolidating the various initiatives aimed at optimising energy use and bridging the demand supply gap. A key aspect of this IDM programme is the promotion and implementation of energy-efficient technologies, processes and behaviours amongst all consumers. IDM’s role is to ensure single ownership of demand side management strategies, objectives and operations throughout Eskom. It takes a market-driven approach to understanding and meeting consumer requirements and provides a platform from which Eskom can collaborate with government, external stakeholders and consumers. Whilst Eskom puts applicant ESCOs through a technical evaluation process before registration (accreditation within Eskom’s systems) and funding is approved, there is currently no formal accreditation system for ESCOs outside this IDM approval process.

Eskom is the largest funder for energy efficiency initiatives through its IDM funding initiatives and programs. The list below indicates the major funding mechanisms:

- DoE SWH Programme
- ESCO Model
- Mass Roll Out
- Performance Contracting
- Residential Mass Rollout
- Standard Offer
- Standard Product
- Standard Rebate

In addition to Eskom, the following stakeholders play major roles in influencing the investment in energy efficiency services and further supporting the growth of South African ESCO industry:

- **The Department of Energy (DoE)** is the custodian of all energy policies and energy security in South Africa.
• The Department of Public Enterprises (DPE) is responsible for the country’s energy infrastructure.
• The South African National Energy Development Institute (SANEDI) is responsible for achieving the objectives of the ‘National Energy Efficiency Strategy of South Africa’ (NEES). SANEDI should become actively involved in solving the known barriers preventing ESCOs’ growth.
• The National Energy Regulator of South Africa (NERSA) is of particular importance at the present time as the regulator allocates the amount of DSM funding through the three year multi-year price determination policy. NERSA also set and approve the Eskom annual Eskom tariff increases.
• The South African Association of ESCOs (SAAEs) with 85 members and Black Energy Service Companies Association (BESCO) with 14 members, act as industry lobbyists. However, they should act as the guardians of the industry and be empowered to guide the ESCO industry role players in removing barriers from the industry.
• Financial Institutions who provide funding to ESCOs and to Energy efficiency projects.

The services offered by local ESCOs have covered different types of energy solutions, maintenance, installation, and many other essential requirements across various sectors of the economy.

Eskom IDM analysis provides an insight into the size of the ESCO market in South Africa

According to the DSM data provided by Eskom (dated 6 February 2012), 1 045 applications were received from 148 ESCOs for access to IDM funding. Of the 1 045 projects, 613 were completed or were being verified and a further 312 were in the implementation phase. The total value of DSM projects funded through Eskom initiatives is around R5.6 billion of which R4.7 billion is for projects in the completion and implementation phases. The following sections present the key outcomes of the analysis of the Eskom data.

Eskom Programme analysis

At the time of the analysis, projects totalling 2 375 MW of contracted demand were initiated. A total of 1 814 MW have been completed and verified (completed phase). This corresponds to over 77% of the total contracted performance of all the IDM projects. A further 8% of the projects were still in the development phase and the remaining 15% were in the implementation phase.

Based on the regional distribution, the completed IDM project breakdown indicates that over half of the projects have been undertaken in the Northern and the Central regions. The Western regional district accounts for the smallest share with only a four percent contribution.

The majority of the Eskom funding has been distributed through a fairly small number of ESCOs. The total number of ESCOs registered is relatively high compared to many other countries where only a handful of ESCOs dominate.
**ESCOs working outside the IDM programmes**

Although many ESCOs rely on Eskom IDM funding for energy efficiency projects, there are ESCOs that work outside the IDM programmes. The sample of ESCOs surveyed as part of the study indicated the following reasons for not going through the Eskom IDM programme for funding:

- perceived red tape, complexity and time taken for public sector approval
- no external funding outside that of the end user was required as the projects were profitable
- time constraints with clients wanting projects to start immediately
- client had to spend their CAPEX budget or lose it if not utilised by year end
- contractual delays due to the difficulty in agreeing the terms and conditions of the Eskom IDM, other contracts, client’s indecision and changes in scope of the projects
- the Municipal Finance Management Act (MFMA) did not allow for municipalities to use Eskom funding
- clients did not know about the funding so were willing to fund energy efficiency projects themselves
- clients believed they were unlikely to be able to obtain IDM funding, and
- some ESCOs were not registered with Eskom.

**Perception of the industry**

The overall perception of the ESCO market, based on the survey and interviews conducted, was positive with 75% of the respondents believing that the industry was stable or strong and more than 80% of the respondents believed that their ESCO business was expecting stable or strong growth.

Less than 20% believed that their ESCO business was declining. However, of these ESCOs 75% indicated that their client was the public sector. The difficulty of doing business with the public sector was highlighted throughout the survey, with the time taken to get projects approved, the PMFA/MFMA requirements and complexity of the tender and procurement processes all being raised as significant barriers throughout the process.

**Funding of Small ESCOs**

Of the ESCOs surveyed, 54% indicated that their average ESCO project was below R1 million. Fifty percent also indicated that the gross annual revenue derived from their ESCO business was below R1 million per annum. This highlighted an area which is not serviced, as most institutions did not fund projects below R1 million. Without pooling/bundling of projects, the FIs are excluding more than 50% of the ESCOs from possibly gaining funding.

**Bundling**

Project bundling allows for the aggregation of individual projects, technologies, service offers, and investments into larger and more comprehensive lots to achieve sufficient economies of scale. The literature also suggests that such a framework should be integrated with mandatory domestic manufacturing for further scope of reducing the costs.

Although only 32% of the companies surveyed had used bundling another 11% were looking at bundling projects and the other 58% should be encouraged to look at bundling as a way to make projects even more viable.
DSM/IDM project approval

ESCOs participating in the IDM projects have identified that the time to approve projects was on average longer than six months. Similarly more than six months were required for final handover. This would indicate that for the majority of the projects IDM approval process from start to finish was in excess of one year. The overall trend noted by ESCOs questioned indicated that the process has been improving and the time taken especially with the technical assessment stage is reasonable, however there is still scope for improvement within the procurement department.

Project payback

The project payback period for almost three quarters of the projects studied was below three years. This means that the extended lending terms offered by financial institutions would not generally be required, except in the case of rooftop PV installations and other complex interventions. The short payback period should make the energy efficiency market an attractive industry for investment within South Africa and reduce the perceived risk to financial institutions.

End-users perspectives

The end-users within the Intensive Energy Users Group (IEUG), which is a group of 38 users consuming approximately 40% of the electricity (IEUG 2010) supplied, highlighted the perceived lack of competencies, skills and capacity of ESCOs as reasons for not utilising the services of ESCOs. The mistrust of the ESCO industry, due to this perceived lack of skills and accreditation, combined with confusion over what an ESCO in South Africa actually is, needs to be overcome for the ESCO market to flourish further within this market.

Views within this group of users varied widely, ranging from an acceptance of the fact that ESCOs provided a useful and necessary service, to a dismissal of their functions and denying any value-add. Reasons for the latter position included concerns over breaches of confidentiality, and the feelings that external ESCOs would not understand their complex businesses. It was also stated that should the company require specific specialist energy skills, these would be bought in and provided in-house.

However, whilst some end-users do have internal capacity for energy efficiency projects, this is not the case across the entire spectrum, thus creating opportunities for ESCO interventions.

It was clear from interviews that the accreditation of ESCOs, would assist in building confidence in the industry amongst end-users.
The main reason given for the need for energy efficiency projects (and thus the need for awareness of ESCOs) was driven by fear of rolling blackouts, with interrupted supply affecting the profits of their operations.

New legislation and the implementation of Carbon Taxes will require the end-users to focus more on energy efficiency projects and this can yet again boost the ESCO market going forward, as will the end users linking senior management bonuses to energy efficiency KPI measures.

7. Assessment of barriers to development of the ESCO industry in South Africa

The barriers to the promotion of the ESCO industry in South Africa have been categorised into seven main barriers and are summarised below. The replies from 30 questionnaires and interviews with ESCOs, three interviews with Intensive Energy User group and six interviews with financial institutions and another four interviews with Eskom, CEF and SANEDI/NEEA provided the backbone for this analysis. A follow-up workshop consolidated and confirmed the findings of the survey.

Whilst a large part of the focus of this study was the identification of financial instruments designed to address the financial barriers identified, it should be recognised that financial barriers are not necessarily the only or most important barriers to the development and growth of the ESCO industry. Comprehensive solutions addressing all of the identified barriers are required to create a vibrant ESCO market in South Africa.

Awareness, information and understanding

There is a low level of awareness and a lack of information and understanding of the ESCO concept, capabilities and benefits in South Africa. This extends to a common definition of what an ESCO is. As a result of this, potential customers are not in a position to assess the benefits of the ESCOs’ offerings. Furthermore, limited knowledge of the industry exists within FI’s, resulting in a lack of funding products.

Trust and scepticism

Trust and scepticism was considered by all stakeholders as a significant barrier to growth of the industry. The four main areas of concern were:

- the lack of perceived technical skills within the industry should be addressed before end users, clients and FIs trust the industry
- no clear definition and standards for ESCOs leading to the perception that many ‘fly-by-night’ ESCOs exist that are not capable of providing a professional service
- complex contracting with no standard contracts create uncertainty for end-users in terms of cost, savings potential, risk transfer, etc.
- lack of accreditation within the ESCO industry, and
- approaches by competing ESCOs with varying products and solutions have created confusion and an environment of distrust. It should be noted that this could be part of the supply and demand cycle experienced by all industries.

The standardization of common core contractual provisions, including clear frameworks, definitions, measurement and verification standards (such as the International Performance Measurement and Verification Protocol) and an accreditation system are essential in order to raise the confidence levels in the market and reduce the mistrust and scepticism that the skills and ethical standards are low within ESCOs.

The establishment of a national legal framework for the identification and the establishment of quality standards and certification schemes for ESCOs are essential to support the ESCO markets and improve confidence levels of ESCOs, especially by the end users.
Measurement and Verification – Energy Audits

The measurement and verification (M&V) process and the base-lining of projects was relatively well understood in principle, however we found that the M&V protocols are not well understood.

The cost of energy audits was seen to be a significant cash flow issue to many ESCOs who are required to fund the energy audits and feasibility studies from money earned on prior projects. The belief that energy audits are free causes significant financial distress, especially to the smaller ESCOs. Some ESCOs estimate that they may provide five to ten energy audits before signing up a client, creating a significant financial burden on ESCOs which is not possible to pass onto projects that go ahead.

In addition, M&V practitioners in South Africa are in short supply. The Tax Incentive scheme, and all other government sponsored EE funding, stipulates that auditing before and after any project be done by a registered M&V professional. This can often be a bottleneck in the system.

National policies, legislation, regulations and incentives

There are a number of national policies, legislation and incentives within the South African industry, however many stakeholders do not know or understand the policies, regulations or incentives that could be applicable to the industry.

The main barrier identified by ESCOs is the belief that the complexity and time consumed for regulatory clearance needs to be addressed, so that ESCO businesses can flourish. Although Eskom’s Standard Offer and Standard Product programmes have been designed to speed up this process, the other spheres of government should assist the ESCO industry by simplifying and speeding up all approval processes.

Financing and resourcing

The lack of financial instruments designed for the ESCO industry, combined with a lack of understanding of the industry, means that many start-up and small ESCOs struggle to raise capital for projects. Conventional financial institutions also tend to view ESCOs and energy efficiency projects as ‘business as usual’ finance applications, and do not apply credit assessment criteria specifically designed for the ESCO industry. As a result of the nature of energy efficiency projects, limited collateral associated with energy efficiency projects, the EPC model and uncertain cash flow, these projects can be assessed as high risk by FIs.

The financial crisis and the general risk averse nature of the South African banks means that access to funding for energy efficiency/ESCO projects, outside of the FIs normal operation, is very difficult. It is only with the assistance of DFIs credit loans and public FIs and institution low interest loans and subsidies, that it is possible to get funding from FIs. In a study of 30 ESCOs, only one claimed to have successfully gained funding from a FI.

The small size of operations was of particular concern for the smaller ESCOs, who believe FI’s will only fund larger ESCOs or those with a strong balance sheet. This was not a particular concern to the FI’s; however larger projects are generally more attractive.

Although many ESCOs have indicated an improvement in the process over time, many ESCOs felt that the time taken to get funding approved was a barrier. As a result, some ESCOs have decided not to pursue funding through the Eskom IDM programmes, especially with government contracts.

End users also indicated that they do not want to use their own budgets for Capex projects and would prefer to get IDM funding for energy efficiency projects. ESCOs comments clearly indicated that projects that do not get 100% IDM Funding do not take place in the tough business environment. The desire by clients to insist on 100% funding when partial funding (say 70%) is on Eskom is a barrier. The IDM funding will only be available and remain viable as long as the cost of saving energy is less than the cost of producing additional capacity or when not supply issues exist.

Three of the top five reasons and barriers that ESCOs believed the raising of funding was difficult were that FIs perceived ESCOs to be high risk. Over 90% of the respondents indicated that the complexity of EPC
structuring and uncertain cash flows caused a measureable or significant impact in obtaining funding. The Eskom IDM data indicated that this was not true, with the majority of the projects being successful, thus suggesting investment into the ESCO industry maybe of a lower risk than many other more conventional industries. Weak balance sheets and skills shortages were the other two in the top five reason or barriers for ESCOs not receiving finance.

**External factors**

The relatively low energy prices in South Africa make energy efficiency projects and the payback on energy efficiency savings more difficult than in other markets globally. For some end users energy costs also constitute a small cost relative to their total operating cost, and as a result energy efficiency projects are not seen to be a top priority.

**Project approval**

The time taken to approve project funding means that ESCOs lose project opportunities as clients sometimes decide that they no longer require the ESCOs services.

**Industry Associations**

Two industry associations (SAAE and BESCO) operate in South Africa, and together they represent 97 ESCO members, while 414 ESCOs are registered on the Eskom database. This means that not all ESCOs are represented by an industry body that can act in their best interest. In addition, the fact that two associations exist further reduces the bargaining power of the industry and increases the risk of public mistrust. It also appears that neither industry body has any real influence or power over public policy or industry decision-making.

**8. Financial Institutions**

**Financial Institutions**

A variety of financial institutions were interviewed during the ESCO market study; these ranged from local and international state-owned development finance institutions, commercial banks, and international financing institutions. The primary financing focus within the energy market has been renewable energy projects rather than energy efficiency. The ESCO energy efficiency market has not attracted the same amount of capital from the banks and in some cases has not even been on the radar due to lack of awareness or a lack of viable projects coming through their doors. The key observations following from the interviews are set out below:

**Technical skills within FIs**

The technical skills predominantly within the financial institutions energy efficiency divisions of the state owned DFIs were noted as Engineers, RE specialists and other specialists such as economists. M&V specialists and Energy consultants were not noted as being technical skills that were within the financial institutions and were not deemed necessary when evaluating energy efficiency projects.

The private banks indicated that the technical skills base within their organisation was similar to the skill sets seen in their other business areas and did not include Energy specialists and engineers as the majority of projects are evaluated on a commercial basis with energy efficiency projects assessed on a structured project by project viability approach.
**Preferential rates**

The local and international lending institutions all indicated that energy efficiency projects are funded at preferential rates. DFIs in particular indicated that the lines of credit that are offered to the commercial and local development financial institutions within South Africa to fund energy efficiency projects are extremely generous, including zero-interest rate loans in some instances.

The DFIs conditions for the preferential lines of credit were in most cases conditional on approval of the energy efficiency projects by the DFIs themselves to ensure compliance with the DFI in-house appraisal requirements and to mitigate perceived risk of the energy efficiency projects.

The lower interest rates are used as an incentive for the FIs receiving the line of credit to move into this new market and develop specific products for the energy efficiency market.

**Training and technical assistance**

Both local DFIs and international DFIs were all keen to provide funds for training and technical evaluation for projects, workshops to improve technical skills within energy efficiency companies and awareness campaigns to try and stimulate the energy efficiency/ESCO market; however, in most cases ESCOs were found to be unaware of these initiatives.

**Capacity development**

The lines of credit with low interest rates provided by DFIs to other FIs for funding energy efficiency projects were often conditional upon capacity building development within the banks, thus ensuring awareness and the development of the knowledge base and skill sets within the South African financial institutions. Capacity building is one of the ways DFIs aim to leave a legacy that will encourage the South African FIs to focus on energy efficiency projects going forward.

**Technology**

New technologies were not considered a risk by the FIs when evaluating a project, although this was seen as a very significant perceived barrier by the ESCOs themselves as funding was a major concern for ESCOs.

**Project size and transaction costs**

Small project sizes and high transaction costs are seen to be problematic especially for small ESCOs. FIs have set minimum funding levels per project at R1 million, which is more than the typical project size delivered by ESCOs surveyed. As a result ESCOs have to fund projects from working capital.

Financial Instruments that could assist the ESCO market going forward are listed below on pages 31 to 32 explaining their key features and the advantages and disadvantages of the instruments.
Table 8 below highlights possible financial instruments identified, and summarises the key features, advantages and disadvantages of these instruments.

<table>
<thead>
<tr>
<th>Financial Instruments</th>
<th>Key Features</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low interest loans</td>
<td>A low interest loan</td>
<td>Fixed guarantee schedule</td>
<td>No flexibility in repayment schedule</td>
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<td></td>
<td></td>
<td>Easy to understand contractual terms</td>
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<td></td>
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<td>Low risk</td>
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<td></td>
<td></td>
<td>Funding can be based on Cash Flow or Balance Sheet</td>
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</tr>
<tr>
<td>Partial Credit Guarantee Fund (PCG)</td>
<td>Partial cover of any default of scheduled repayments of principal and accrued interest.</td>
<td>Assist companies with low collateral/asset value</td>
<td>Too many defaulters may collapse the entire market</td>
</tr>
<tr>
<td></td>
<td>ESCOs tapping the Guarantee Fund would have to pay an administrative fee to the Fund.</td>
<td>Risk mitigation for financial institutions</td>
<td>High transactional costs may reduce the financial feasibility of the projects</td>
</tr>
<tr>
<td></td>
<td>The lender or financial institution making the loan to the ESCO would receive contingent payments from the Escrow account in the event of defaults covered under the guarantee.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seed capital for project development/Working capital loans, with collateral</td>
<td>A typical incentive structure could be in the form of transaction/processing fee waiver to encourage small and medium ESCO players to develop more EPC based projects in potential sectors.</td>
<td>Compensate ESCOs for project development costs</td>
<td>Low value investments may increase the transaction costs for FIs</td>
</tr>
<tr>
<td></td>
<td>Short term working capital loan products specific to energy efficiency project development, skill development and training of ESCO staff</td>
<td>Reduction in transaction costs for ESCOs</td>
<td></td>
</tr>
<tr>
<td>Takeout Financing</td>
<td>It is an arrangement where the loans will be taken out of books of the financing bank within pre-fixed period, by another institution thus preventing any possible asset-liability mismatch. After taking out the loans from the banks, the institution could off-load them to another bank or keep it.</td>
<td>It ensures that the project with unusually long payback periods gets long-term funding through various participants</td>
<td>Depreciation may decrease the collateral value</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Low collateral value may increase the risk of investments</td>
</tr>
<tr>
<td>Convertible Preference shares</td>
<td>The instrument is a hybrid of debt and equity. The repayment of the loan is through dividend payments and redemption at the</td>
<td>Dividend payment can be more flexible than interest and loan repayment terms and can be triggered by varying options. The preference shares are less risky than equity. Preference shares allow the FIs to take ownership on default of payment</td>
<td>The preference shares are subordinate to senior debt. The shares carry more risk than debt funding</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Payment may be less regular. On default the FI may have to take over underperforming assets</td>
</tr>
<tr>
<td>Financial Instruments</td>
<td>Key Features</td>
<td>Advantages</td>
<td>Disadvantages</td>
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<tr>
<td>Low value term loan products R500,000 to R1 million</td>
<td>A low interest loan that provides loans to customers on loan amounts below R1 million</td>
<td>Fixed guarantee schedule. Easy to understand contractual terms Funding can be based on Cash Flow or Balance Sheet</td>
<td>No flexibility in repayment schedule Very High administrative costs Less pooling or bundling strategies are developed</td>
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<tr>
<td>Seed capital for project development/without collateral</td>
<td>A typical incentive structure could be in the form of transaction/processing fee waiver to encourage small and medium ESCO players to develop more EPC based projects in potential sectors.</td>
<td>Compensate ESCOs for project development costs Reduction in transaction costs for ESCOs</td>
<td>Low value investments may increase the transaction costs for FIs</td>
</tr>
<tr>
<td>Venture Capital fund / Subordinated Debt</td>
<td>Risk capital support to energy efficiency investments in new technology, goods and services, etc.</td>
<td>Bridge the equity gap in emerging ESCO markets High return on investments</td>
<td>Risky investments and require extensive due diligence</td>
</tr>
<tr>
<td>Preferred drawing rights agreements</td>
<td>Risk transfer/sharing instrument The borrower agrees that the lender is paid automatically at a defined payment date each payment period (monthly, quarterly) and this amount is automatically withdrawn from the borrower's primary bank account.</td>
<td>Reduce the default risk loan products and increase the customer base</td>
<td>The challenge would be to develop standard agreement for leveraging such a facility. The development of standardised preferred drawing agreement specific for its energy efficiency products would be time consuming.</td>
</tr>
<tr>
<td>On Bill Financing (OBF)</td>
<td>Integrating loan payments with energy bills and allowing utilities to cut off energy supply to defaulting customers has the potential to both lower collection costs and enhance credit quality of the financing scheme, thereby lowering financing costs. Payment via utility bill reduces risk of credit default and lowers collection risk.</td>
<td>Allowing customers to make energy efficiency loan payments on their utility bill reduces customer engagement barriers and promotes program participation. The threat of disconnecting utility service in the case of default can provide security for lenders Efficient cost effective method of collection</td>
<td>Politically sensitive since the default may lead to discontinuing of utility services to the customer In case of partial bill payment by a customer, utilities might pay themselves before paying the lender Many municipalities have a low collection rate, thus high risk on collection of money</td>
</tr>
<tr>
<td>Forfeiting</td>
<td>Forfeiting is a form of transfer of future receivables from one party (cessionary – an ESCO) to another (buyer – a FI). The original creditor (the ESCO) cedes his claims and the new creditor (the FI) gains the right to claim future receivables from the debtor (the client). The ESCO sells future receivables to an FI in return for a discounted one-time payment.</td>
<td>Provides virtual collateral to small and medium sized ESCOs</td>
<td>A cession of future receivables is not a stand-alone financing option, but can serve as additional collateral for the FI.</td>
</tr>
</tbody>
</table>
9. **Enabling factors for promotion of ESCO industry in South Africa**

The ESCO industry in South Africa is facing several barriers related to awareness, information, understanding, financing, resources, national policies, legislation, regulation, incentives, high transaction costs, trust and scepticism. Certain enabling programs are needed to support the ESCO industry growth and stakeholders may find it extremely difficult to sustain the pace of investments and meet the overall targets proposed under the national energy efficiency strategy of South Africa. In this regard, a number of key enabling factors were proposed by the ESCO industry, financial institutions and the end user associations consulted during this study.

In response to the barriers identified in this report, the following key enabling programmes are recommended:

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<td>Standardising EPC contracts</td>
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<td>White Certificates</td>
<td>National Energy Regulator in South Africa (NERSA) to regulate certificate pricing</td>
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<td>Super ESCO for public sector</td>
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<td>ESCO specific tax incentives within the income tax act</td>
<td>The dti, National Treasury, SARS and other relevant governmental decision makers</td>
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<td>Awareness campaigns</td>
<td>The DoE, SANEDI, the dti, municipalities and Eskom.</td>
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<td>Government grants, technical assistance, training and development subsidies</td>
<td>SANEDI, the dti and the DoE</td>
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**Accreditation**

Accreditation of energy service companies is a mechanism to expand the number of competent ESCOs through an open invitation and evaluation process. This process formally exists for energy efficiency projects delivered under the current Eskom schemes. To become a registered supplier, an ESCO must be registered with Eskom. All companies applying for registration with Eskom have to undergo an intensive screening process. Each company is registered and classified as either Category A (Industrial), Category B (Commercial) or Category C (Residential) suppliers.

The Eskom IDM evaluation process considers:

- the experience of the ESCO
- the approach they take towards managing projects
• the technical, financial and legal approach of the potential supplier to projects, and
• the procurement approach.

It is recommended that SANEDI, who are the custodians of energy efficiency as mandated by the National Energy Act 2008, becomes the independent accreditation organisation in South Africa in order to create a sense of credibility amongst the prospective financial institutions and end users that are likely to provide finance and secure the services of an ESCO. This will allow for an accreditation process for all ESCOs, and not limited to ESCOs doing business with Eskom. A process of rating and classifying of ESCOs into groups of ESCOs should be taken up through the use of a well-designed and thought-out scorecard.

The rating should be carried out in terms of success in implementation of energy efficiency projects based on performance contracting, availability of technical manpower, financial strength, etc. The following criteria may also be used to rate the ESCOs in South Africa:

• Business Risk Factors – essentially track record and market position in ESCO/energy management businesses.
• Organizational Risk – the ability of the management to gear up for ESCO contracts.
• Financial Risk – the financial strength of the company to invest in ESCO projects.

Benefits of independent accreditation

• All reputable ESCOs, not just those registered with Eskom, would be recognised and categorised, providing a more accurate up to date assessment of the ESCO industry.
• Technical due diligence: The exercise of accreditation of ESCOs through rating agencies would help in providing the technical due diligence on projects.
• Enhanced Credibility: enhanced credibility to the nascent industry and increased investor confidence
• Extensive Rating: A comprehensive rating based on predetermined and accepted criteria will help to overcome the barrier of inadequate information about the ‘ESCO based performance contracting’.
• Potential ESCOs: New organisations that have the potential to become ESCOs are adequately addressed through these ratings.
• Better awareness creation could spur larger energy efficiency projects: Energy users would be better placed if there were some guidelines available on the need and requirement for undertaking such projects.

The above recommendation is in line with other activities that SANEDI is already overseeing; including M&V, coordinating training, prioritisation and recommendation of DSM projects, development and implementation of energy efficiency campaigns and co-operation with associations to ensure that international best practices are applied in South Africa.

Greater access to affordable and appropriate training

There is a need in the South African ESCO market for skills development and accreditation of the professionals within the industry in order to bridge the skills gap and provide for growth and robustness of the industry going forward.

At present, Eskom has provided some technical skills training and workshops to assist the industry, however even more organised and systematic training is required. Given the developmental state of the industry and some of the players in it, it is deemed appropriate to include business skills, business development, soft skills, etc, into the proposed curriculum to ensure that a comprehensive solution is developed to ensure the sustainable development of the industry.

At present, the cost of training is expensive and prohibits small ESCOs in particular from up skilling their staff into M&V specialists, Certified Energy Auditors (CEA), and Certified Energy Managers (CEM), as well as improving the technical skills with registered plumbers, electricians etc. It is recommended that government subsidies and assistance through the skills development levy and other assistance programmes be put in place to target and develop the energy efficiency and green energy industry in South Africa.
**Further simplification and streamlining of the Eskom IDM approval process**

Although the technical appraisal process is working well within the Eskom IDM programme, other areas require greater attention to address time delay issues experienced within the industry.

NERSA should be encouraged to provide proposed electricity tariffs over a longer period so that ESCOs and end users can realistically calculate the profitability and payback period for energy efficiency projects.

Consideration could be given to transferring the IDM programme to SANEDI. This would allow knowledge of the industry to be passed onto SANEDI and ensure the sustainability and long term future of the ESCO industry. SANEDI would not only act as the independent accreditation authority, but it would also manage the future IDM programmes, thus providing the industry with long term solutions.

**Standardization of EPCs, contractual provisions and product labelling**

The standardisation of common core contractual provisions, including project evaluation frameworks, definitions, measurement and verification standards, is essential to support the ESCO industry and improve confidence in the end users.

Standardized equipment lists, templates for tender documents and contracts which provide a successful procedure protocol for carrying out parts or all of the ESCO operations should be developed. Templates and protocols are usually useful for embryonic markets and for building trust in the ESCO business in general. At present, standardized EPC contracts exist through the IDM programme. However, they do not exist between end-users, clients and ESCOs, thus providing mistrust and contractual agreements that may be prejudicial to one of the parties. It is recommended that standardized EPCs be developed by SANEDI or the dti by using already available contracts available internationally and sanitizing them for the South African ESCO industry.

Recently, the South African Bureau of Standards (SABS) has introduced energy efficiency labelling standard for appliances. The standards are aimed at empowering consumers to make informed choices when purchasing appliances, such as dishwashers and television sets.

It is recommended that not only should labelling be standardized across competing brands to enable consumers to make a quick comparison, but also include the energy consumption at local rates so that customers can quickly assess the benefits of buying the more expensive energy efficient product.

It is recommended that SANEDI should develop a database of manufacturing energy efficient equipment: This directory should provide a list of manufacturers of Energy Efficient Equipment and list the commonly used standard efficiency equipment and suggest suitable replacements, and also give information on the price premium and other advantages like increased life, enhanced performance, etc. if applicable.

The standardisation of contracts and technologies could be jointly run by SANEDI and Eskom. Eskom has have published lists for Standard Products and Standard Offer products and technologies, and this information will assist the process going forward.

**Mechanisms to fund the costs associated with financing of the initial energy audits**

Energy auditing and feasibility studies were considered a burden to most ESCOs for two main reasons:

- It is considered to be a free service that is expected to be provided at risk, with compensation only taking place of an energy efficiency project contract is signed. This creates a sunk cost that is not recoverable.
- Working capital management frequently puts undue financial pressure on ESCOs who have to finance energy audits through other projects and bridging loans.

It is recommended that a list of private firms who are qualified to carry out energy audits should be established under SANEDI so that the market is promoted.
It is recommended that a cost should be attached to energy audits and the client should pay for the audit but be able to recover the cost in three ways:

- refunded by Eskom on approval of their IDM projects
- financial institutions pay a fixed amount back to the client depending on his category (i.e. small-scale industries would be paid a defined amount while medium-scale industries would be paid a larger amount), and
- a cost sharing scheme where financial institutions and the client would receive a quote on the cost of an energy audit. Upon signing a letter of intent, the FI pays for a fixed percentage of the audit fees (e.g. 50%) and will pay the remaining 50% of the audit fees upon the client signing a financing arrangement with the financial institution.

The above recovery of audit costs would free up the working capital of the ESCOs who could utilise the money to further develop their ESCOs.

It is recommended that energy audits should be provided at a cost to the client and that it becomes an industry standard, championed by the ESCO associations.

**Mandatory laws, regulations and control mechanisms**

The public sector should be used as an initial target market in order to promote energy efficiency and promote the emerging ESCO industry. The policy makers in South Africa should consider adaptation of the public procurement laws to facilitate the evaluation of energy efficiency service providers. The public procurement cost evaluation should take into consideration lifecycle costs, including maintenance and energy costs.

The public sector should allow the inclusion of energy efficiency in technical tender specifications and use of lifecycle costing in public tender specifications. Clear, practical and ready-to-use guidelines on how to apply energy efficiency criteria in public procurement procedures are needed in order to improve the practical implementation of energy efficient public procurement.

Apart from changes in public procurement laws, a stringent regulatory framework with mandatory energy efficiency targets can create demand for energy audits and energy efficiency investments and raise the awareness of energy efficiency measures, thus lowering investment risks. Many countries have clearly defined targets in terms of savings for the next decade or two.

The national energy efficiency strategy of South Africa has clearly defined targets for energy demand reduction in various sectors of the economy. A stringent compliance framework must be established for energy intensive user groups with penalties for non-compliance.

The dti should be one of the main driving forces in Government that promotes laws, regulations and standards that will encourage greater energy efficiency in South Africa.

**White Certificates**

It is recommended that trading of certificates in the secondary market be encouraged to generate secondary revenues and reduce the cost of energy conservation measures for ESCOs and end-users. Internationally, many countries like Italy have established such markets (called tradable white certificates) and have successfully generated additional revenue for the ESCO industry. These white certificates may then be sold to energy intensive users to fulfill their energy efficiency obligations. Such secondary revenues will increase the financial viability of ESCO projects and attract more investments from various sources in the capital market and debt markets of South Africa.

The following figure shows a diagrammatic relationship between various entities in a white certificate market. Here SANEDI can effectively play the role of verifying energy savings and NERSA can regulate the certificate prices by playing the role of market operator.
At present, it is unlikely that White Certificates will take off in South Africa as the Eskom DSM grants is a scheme that can be seen as a direct competitor to White Certificates. The South African market has also not in the past embraced the trading of certificates, and this appears unlikely to change in the short term. White Certificates also work better in an environment where a number of utility companies exist, which is not the case in South Africa. The introduction of Independent Power Producers (IPPs) is unlikely to change the dynamic, as the producers will still be selling directly to Eskom at the guaranteed price in their bid submission document, and thus only one main utility/distributor will be present in South Africa.

The establishment of Super ESCO for the public sector

A Super ESCO is an entity that should be established by the Government possibly under the DoE. Super ESCOs in India and America may be studied to define the roles and responsibilities within a South African appropriate context.

The South African Super ESCO will assist in harnessing savings from the public sector a sector that so far is largely untapped.

The Super ESCO would:

- play a critical role in providing the risk capital (equity) to small sized ESCOs
- serve as an ESCO for the large untapped public sector
- support capacity development and activities of other ESCOs
- facilitate access to project financing
- lead and demonstrate implementation of energy efficiency projects on performance contracting
- leverage multilateral and bi-lateral financing - enter into partnerships, JVs with other implementing partners like ESCOs, industry, etc. to promote energy efficiency
- provide consultancy services to private and public sector in the areas of energy efficiency, CDM, etc, and
- create an ESCO market where skills can be transferred into other parts of the ESCO industry through training and technical expertise gained on projects.

The establishment of a Super ESCO is something that must be assessed in detail before being established in order to ensure that it succeeds as it did in the USA, and not fall prey to the failures of the Super ESCO in Spain.
Awareness campaign

It is recommended that awareness campaigns be initiated by the SANEDI, municipalities, DoE and dti (independent of Eskom) that publicises the financial benefit to customers when making energy reduction decisions. The campaign would put Rand values to the savings made by:

- changing old technologies for energy efficiency technologies (e.g. CFLs)
- savings over a year, e.g. by switching off a light by two hours a day, and
- putting an average Rand value on energy savings.

Eskom’s 49 Million initiative should continue to encourage people to switch off electrical equipment when not in use.

Other awareness campaigns would include education on green issues, sustainability, ways to save electricity, and the development and implementation of comprehensive energy efficiency campaigns for the general public; such as joint promotion programs with the manufacturers andESCOs and organised energy efficiency exhibits at conferences and trade fairs.

A database of manufacturers of energy efficient equipment with a directory that provides a list of manufacturers of Energy Efficient Equipment, as well as a list of commonly used standard efficiency equipment with suggest suitable replacements, should be created. Information on the price premium and other advantages, such as increased life, enhanced performance would assist the public in making informed decisions on energy efficiency, should be made available.

ESCO specific Tax incentives for implementation of energy efficiency projects

Tax legislation can be very effective in improving the investor sentiments to projects that would normally require government funding. By allowing tax-deductible investments in certain types of projects, companies/individuals gain a tax shield. Internationally, many countries have reduced customs and excise duties to bring down the cost of energy efficient technology and equipments; making it more affordable to the end user.

Government grants, technical assistance, training and development subsidies

Ensuring appropriate mechanisms for project development and delivery is critical for generating a steady flow of investment-ready projects for the ESCO industry. The tools available for ensuring bankable ESCO projects include:

- targeted communication about the profitability of energy efficiency investments, and
- programmes and technical assistance facilities that build the capacities ofESCOs, energy auditors, end users to develop and structure finance for projects, most notably providing training for feasibility study and business plan preparation across a range of possible project proponents.

Through the dti and SANEDI, the Government should provide resources to prepare bankable proposals detailing the technical feasibility, project economics and other critical parameters. Investment grade energy audit reports of public buildings, municipalities, agriculture pumps and SMEs could be developed using government grants. The findings of these reports should be orchestrated through various mediums like national workshops and conference. This process can also build on the outputs of demonstrated pilot projects initiated and implemented solely by state/central nodal agencies. Such packages can unleash a significant replication potential across local authorities once successfully implemented in one city/region and further strengthen the investment scenario forESCOs in the country. Further skills development within the DoE and SANEDI to support these initiatives should also be considered.
10. Conclusion

The study indicated that the access to and the raising of finance was a significant barrier to the development of ESCOs, except for the largest ESCOs which do not have funding problems. Creating access to funding only will not be sufficient to create a vibrant ESCO market in South Africa. A holistic approach should be taken, addressing all of the identified barriers.

Using lessons learnt from other ESCO markets around the world, South Africa must have laws and regulations that promote both the small and large ESCO market players, to ensure that both can co-exist and prosper together, unlike the USA where only a handful of ESCOs exist.

Accreditation, categorisation and registration of the industry needs to be promoted and develop further to ensure that the scepticism that exists and the lack of knowledge on ESCOs and their different roles in the industry can be overcome and trust of the industry nurtured to an extent that both financial institutions and end users will want to fund and make use of numerous ESCOs.

As the industry becomes more developed and the financial institutions skills base and knowledge of the industry will improve, while the perceived risk of projects decreases and the number of successful projects increase, this will create an environment where lending to ESCOs at lower interest rates will be deemed less risky.

The ESCO market is likely to grow over the next few years as awareness of the benefits of energy saving both for the environment and their bottom line/back pocket makes moving to more energy saving initiatives and products make viable financial sense.

Other key initiatives that could further assist the market in the coming years are the introduction of carbon taxes, streamlining of projects, the possible introduction of white certificates and a Super ESCO, standardising of EPC contracts, an improving skills base and accreditation within the industry. These will ensure that the industry begins to flourish and become more vibrant.
References


