



# APPLICATION GUIDELINES FOR THE ASSESSMENT AND ACCREDITATION OF ENERGY SERVICES COMPANIES (AUDITING SERVICES)

March 2005

**Energy Sustainability Unit  
(EDB-LEAP Partner)**  
Department of Building  
School of Design and Environment  
National University of Singapore

*Towards Energy-Efficient Environment  
and Sustainable Development*

Accreditation Scheme Supported by:



## **Publisher**

### **Energy Sustainability Unit (EDB-LEAP Partner)**

Department of Building  
School of Design and Environment  
National University of Singapore  
4 Architecture Drive, Singapore 117566

**Tel** : (65) 6874 4082/4083  
**Fax** : (65) 6773 3837  
**Email** : [bdgleese@nus.edu.sg](mailto:bdgleese@nus.edu.sg)  
**Website** : <http://www.esu.com.sg>

(c) Energy Sustainability Unit, 2005

All rights reserved. No part of this guideline may be reproduced, stored in retrieval systems or transmitted in any form by electronics, mechanical, photocopying means or otherwise without prior permission by the publisher. While every care has been taken in compiling the information in this book, the publisher cannot be held responsible for any error or omissions.

## Table of Content

	<b>Page No.</b>
<b>Glossary</b>	<b>3</b>
<b>1.0 Introduction</b>	<b>4</b>
1.1 Need for Energy Services Company (ESCO) Accreditation (Auditing Services)	4
1.2 Purpose of Guidelines	4
<b>2.0 Energy Audit</b>	<b>4</b>
2.1 Definition of Energy Audit	4
2.2 Scope of Work of Energy Audit	5
2.2.1 Level I Audit - Preliminary	5
2.2.2 Level II Audit- Standard	5
2.2.3 Level III Audit - Comprehensive	6
2.2.4 Documentation	6
<b>3.0 Type and Coverage of Accreditation</b>	<b>6</b>
<b>4.0 Requirement for Accreditation</b>	<b>7</b>
4.1 Existing ESCO (In operation for 3 or more years)	7
4.2 Newly Formed ESCO (In operation for less than 3 years)	7
<b>5.0 Application and Assessment</b>	<b>7</b>
5.1 Scope of Accreditation	7
5.2 Conditions for Accreditation	8
5.3 Accreditation Criteria and Assessment Procedures	8
5.4 General Accreditation Criteria	8
5.5 Technical Capability Assessment	9
5.5.1 Personnel Technical Competency	9

5.5.2 System and Equipment Set-Up.	9
<b>6.0 Submission of Application</b>	<b>10</b>
6.1 Accreditation and Renewal Fee	10
6.2 Acceptance of Application for Accreditation	10
6.3 Issuance of Accreditation Certificate	11
6.4 Accreditation Renewal	11
6.5 Confidentiality	11
6.6 Code of Practice/Conduct	11
6.7 Obligation and Additional Requirements from Accredited ESCOs	11
6.8 Register of Accredited ESCO (Auditing Services)	11
<b>7.0 Further Information</b>	<b>12</b>
<b>Annex 1</b>	<b>13</b>
Assessment Procedures flow chart	
<b>Annex 2</b>	<b>14</b>
Application Form	
<b>Annex 3</b>	<b>17</b>
Key Qualified Personnel Information Form	
<b>Annex 4</b>	<b>20</b>
List of Energy Auditing Projects Completed by the Applicant	
<b>Annex 5</b>	<b>21</b>
List of Equipment and Instruments	
<b>Annex 6</b>	<b>22</b>
Information to be supplied	

## **Glossary**

AS	Australian Standard
ASHRAE	American Society for Heating, Refrigerating and Air-Conditioning Engineers, Inc.
CEMS	Certified Energy Manager of Singapore
CIBSE	Chartered Institution of Building Services Engineers, UK
ECCJ	Energy Conservation Center, Japan
EDB	Economic Development Board of Singapore
EMA	Energy Market Authority
EPC	Energy Performance Contract
ESCO	Energy Services Company
ESU	Energy Sustainability Unit
KQP	Key Qualified Personnel
LEAP	Locally-based Enterprise Advancement Program
NEA	National Environment Agency
NUS	National University of Singapore
NZS	New Zealand Standard

## **1.0 Introduction**

### **1.1 Need for Energy Services Company (ESCO) Accreditation (Auditing Services)**

The energy service sector is a strategic and emerging sector with significant growth potential in Singapore and the region. The development of this sector serves to expand the general service sector, underpins economic development through enhancing cost competitiveness and at the same time strengthens Singapore's energy security.

The energy service sector is also a natural segment of the knowledge economy, providing sustainable environmental benefits. It paves the way for Singapore's development towards a developed economy.

For the purpose of this document, an ESCO is a company dedicated to the provision of energy efficient technology and services including financing, design, implementation and management of projects.

In this respect, an ESCO Accreditation System is an important market development measure for Singapore. The establishment of an accreditation scheme may lead to the following benefits:

- Development of professional and qualified ESCOs and energy engineers;
- Enhance the standing of ESCOs, and in particular energy auditing services;
- Support services procurement and selection procedures;
- Support public sector incentive schemes in the promotion of energy efficiency; and
- Reduce wastage and false claims amongst industry players.

### **1.2 Purpose of Guidelines**

The aim is to establish clear and objective criteria for the assessment and accreditation of ESCOs and/or companies in the provision of energy auditing services for Building and Industrial facilities. It serves to establish a Register of Accredited ESCOs (Auditing Services) and enhance the professionalism of ESCOs practices. This streamlines the procurement process and reduces overall tendering cost to Clients who intend to engage such services.

These guidelines form part of a larger framework to accredit the full range of ESCO's services. The overall objectives are to enhance professionalism and quality of services offered by ESCOs. This, in turn, leads to confidence in the energy services sector and hence promotes the growth of the sector.

## **2.0 Energy Audit**

### **2.1 Definition of Energy Audit**

An energy audit is usually carried out in an existing building or facility with the objective of improving its energy efficiency. It is an investigation involving a detailed analysis of energy flows into and out of a facility. The aim is to identify and quantify those areas where improvements can be made and estimate the extent of savings achievable. These may include improvements to facility design and installation, operation and management.

Energy audit is commonly performed by ESCOs to improve the energy efficiency of a facility. Energy auditing plays a vital role in the success of any energy efficiency improvement project and/or energy performance contract (EPC).

There are several types and levels of energy audit performed by ESCOs. The general scope of work expected from ESCOs in performing different levels of energy audits work is described in the guidelines.

### **2.2 Scope of Work of Energy Audits**

The various levels of energy audit commonly undertaken by ESCOs may be classified as follows:

#### **2.2.1 Level I Audit - Preliminary**

Level I audit, sometimes referred to as preliminary audit, allows the overall energy consumption of the facility to be evaluated. It is expected to give an overview, providing a rough estimate of savings and costs.

This audit is usually designed to determine if the level of energy use of a facility has been reasonable or excessive. It provides initial benchmarks of the facility so that the effect of energy measures may be monitored and evaluated. It may or may not involve site visit. The information given to or gathered by the Auditor needs to be sufficient to enable the overall efficiency of the facility to be ascertained.

The scope of work for Level I audit is as follows:

- Gather facility wide energy use on a monthly and/or annual basis;
- Derive performance indicator;
- Broad conclusions and recommendations; and
- Written report.

#### **2.2.2 Level II Audit - Standard**

Level II audit identifies the source of energy to a facility, the amount supplied and what the energy is used for. It also identifies areas where

savings may be achieved, recommends measures to be taken, and provides a statement of costs and potential savings. It also involves short term metering and logging.

The expected scope of work for Level II audit is as follows:

- Follow-up from Level I audit and report where available;
- Facility investigation;
- Detailed facility and systems' energy input and energy use;
- Reconciliation of energy accounts with loads;
- Variation on energy use on a month-to-month basis;
- Energy performance indicators;
- Recommend improvement work with indicative cost and saving;
- Implementation priority and plan;
- Align recommendations with client's energy program; and
- Written report and presentation.

### 2.2.3 Level III Audit – Comprehensive

Level III audit provides a detailed analysis of energy usage, the savings that can be made, and the cost of achieving those savings. It may cover the whole facility or may concentrate on an individual item and/or system, such as a single industrial process or one of the services. It also involves long term detailed metering and data logging.

The expected scope of work for Level III audit is as follows:

- Follow-up from Level II audit and report where available;
- Define facility/process audited;
- Facility/process investigation and detailed measurements;
- Detailed metering down to half-hourly time interval where required;
- Derive target energy use and develop baseline model where relevant;
- Detailed recommendations including costs, savings and accuracy of estimates;
- Detailed investment plan;
- Suggest refinement to energy policy and energy program; and
- Written report and presentation.

### 2.2.4 Documentation

All energy audit reports and subsequent implementation reports shall be prepared in accordance with requirements specified by established international standards and codes. References shall be made but not limited to the following documents for this purpose:

- AS/NZS 3598:2000 – Energy Audits;
- ASHRAE RP-669, SP-56: 2004 – Procedures for Commercial Building Energy Audits;

- CIBSE TM22:1999 - Energy Assessment and Reporting Methodology; and
- Other equivalent international standards and codes.

### **3.0 Type and Coverage of Accreditation**

The Applicant may seek to obtain accreditation for Level II and/or Level III energy audit services under the following categories:

- General: For all types of facility and for Levels II and III audits.
- Building: For whole building audit and/or system/component audit.
- Industry: For whole industry facility audit and/or system/component/process audit
- System/Facility/Process: For specific system, component and/or process audit.
- Others : Details to be given by Applicant

### **4.0 Requirements for Accreditation**

#### **4.1 Existing ESCO (In operation for 3 or more years)**

To qualify for accreditation, the ESCO or company must comply with the following requirements:

- 1) The Applicant shall have undertaken a minimum of Nine (9) energy audits at Levels II and/or III according to Section 2.2 within the immediate past Three (3) years;
- 2) The Applicant shall have under its full-time employment a minimum of One (1) Key Qualified Personnel, as defined in Section 5.5.1, as the main person to oversee, manage and carry out energy auditing services work; and
- 3) The Applicant shall be equipped with calibrated measuring equipment and instrumentation to carry out energy audit, as described in Section 5.5.2.

Failure to satisfy any of the above Three (3) requirements will render the Applicant disqualified for accreditation.

#### **4.2 Newly Formed ESCO (In operation for less than 3 years)**

For Applicant whose company is in operation for less than Three (3) years, the Applicant may be provisionally accredited on a 12 monthly basis, up to a maximum period of Three (3) years, whereupon full accreditation shall be sought.

Full accreditation may be granted after the Applicant has successfully met the full requirements upon the completion of Three (3) years of operation.

## 5.0 Application and Assessment

### 5.1 Scope of Accreditation

The accreditation scheme as outlined in this document shall apply to the provision of energy auditing services by an ESCO and/or company with respect to Levels II and/or III energy audit. The classification and the respective scope of work are as described in Section 2.0.

This accreditation shall be assessed on the Applicant's expertise, capability and track records in the respective sector(s) of industry and category as indicated in the application.

### 5.2 Conditions for Accreditation

An applicant, in submitting an application, is deemed to acknowledge that the sole basis of such an application is the submitted document.

Applicant is advised to thoroughly read and check the guidelines before submitting an application.

Application shall be made on a voluntary basis.

The ESU accepts no responsibility for any expenses, loss or damage which may arise from the interpretations and preparation made by the Applicant including the information contained therein, or omitted from the submitted document.

### 5.3 Accreditation Criteria and Assessment Procedures

Upon the receipt of an Application, an assessment will be made to determine the level of compliance with respect to the established guidelines. Applications will be assessed on the basis of the information submitted.

A flow diagram showing the assessment procedures is given in **Annex 1**.

### 5.4 General Accreditation Assessment Criteria

The general assessment criteria are as follows:

- i) Performance records on the following aspects of energy efficiency audit/assessment, management and EPC projects:
  - Building/facility energy audits/or assessments
  - Energy measurement and verification protocols
  - Installation and project management
  - Post-Implementation report of completed projects

- Records of energy saving achieved (against guaranteed saving where relevant)
- ii) Industrial and Workplace Occupational Safety policies and records.
- iii) Detailed company work profile.
- iv) An acceptable organizational structure and legal entity.
- v) Applicant must be solvent and be backed by sound technical organization.
- vi) Range of additional service capabilities, e.g. facility management

## 5.5 Technical Capability Assessment

### 5.5.1 Personnel Technical Competency

For the purpose of this accreditation, the criterion of technical competency of the Applicant is measured in terms of personnel competency. The technically qualified person shall be called the "Key Qualified Person (KQP)". The KQP may be qualified under any one of the three (3) following categories:

- 1 - Person having been qualified as Singapore's Certified Energy Manager, CEMS.
- 2 - Person having a relevant professional qualification, and have Two (2) years of post certification experience under an established certification or accreditation system, including USA Association of Energy Engineers' Certified Energy Manager, Australian Institute of Refrigeration, Air-conditioning and Heating Inc's Registered Energy Auditor, Energy Manager Certificate (ECCJ of Japan), or other similar/equivalent internationally recognised certification system.
- 3 - Person having a relevant engineering degree and has completed a minimum of Three (3) energy audits at Level III within the immediate past Three (3) years.

### 5.5.2 System and Equipment Set-Up.

In order to assess the Applicant's adequacy in providing a comprehensive energy audit services at Levels II and/or III, the Applicant must provide a list of equipments/instrumentation available for such work, including the photographs and specifications of these equipment. The applicant shall also provide details on the status of equipment accuracy and calibration.

For this requirement, the Applicant may be equipped with the following equipment and instruments to carryout detailed energy audit and collect the required field data according to Section 2.0 above:

- 1) Energy Meter
- 2) Power Transducer
- 3) Data Logger
- 4) Ultrasonic Flowmeter
- 5) Power Quality Analyser
- 6) Current/Voltage Clamp Meter
- 7) Pressure Indicator/Probe/Sensor
- 8) Temperature Indicator/Probe/Sensor
- 9) Humidity Level Indicator/Sensor

As for the calibration of equipment, Applicant shall provide information on standard/reference adopted either through Manufacturer/Supplier's guidelines/manual or Third Party independent certification.

Applicant should also provide information with respect to the use of energy simulation software or programmes, especially for Level III energy audit.

## **6.0 Submission of Application**

When submitting application for accreditation, the applicant must complete and submit the following:

- A completed Application form
- QKP Information form
- A completed form listing successfully completed Energy Auditing projects
- A completed form listing Equipment and Instruments
- Provide all relevant information requested as given in **Annex 6** herein.

The completed forms and documents are to be forwarded to:

Energy Services Companies (Auditing Services) Accreditation  
c/o Energy Sustainability Unit  
Block SDE1 Level 3  
Department of Building, School of Design and Environment  
National University of Singapore  
4 Architecture Drive  
Singapore 117566

The Application and its accompanying documents shall be enclosed in a sealed envelope labelled "Confidential".

The sample copy of relevant forms and templates for the preparation of the application are given in **Annexes 2 to 5** of the Guidelines.



- malpractice and/or fraud;
- major change to the company structure and/or personnel

The ESU has the right to remove an accredited company from the register; or temporary suspend any member on the register for a period deemed appropriate.

#### 6.7 Obligation and Additional Requirements from Accredited ESCOs

An accredited company shall be obliged to inform the ESU of any major change in the company. Such major changes may involve the company's ownership, financial status, structure, and/or movement of its KQP.

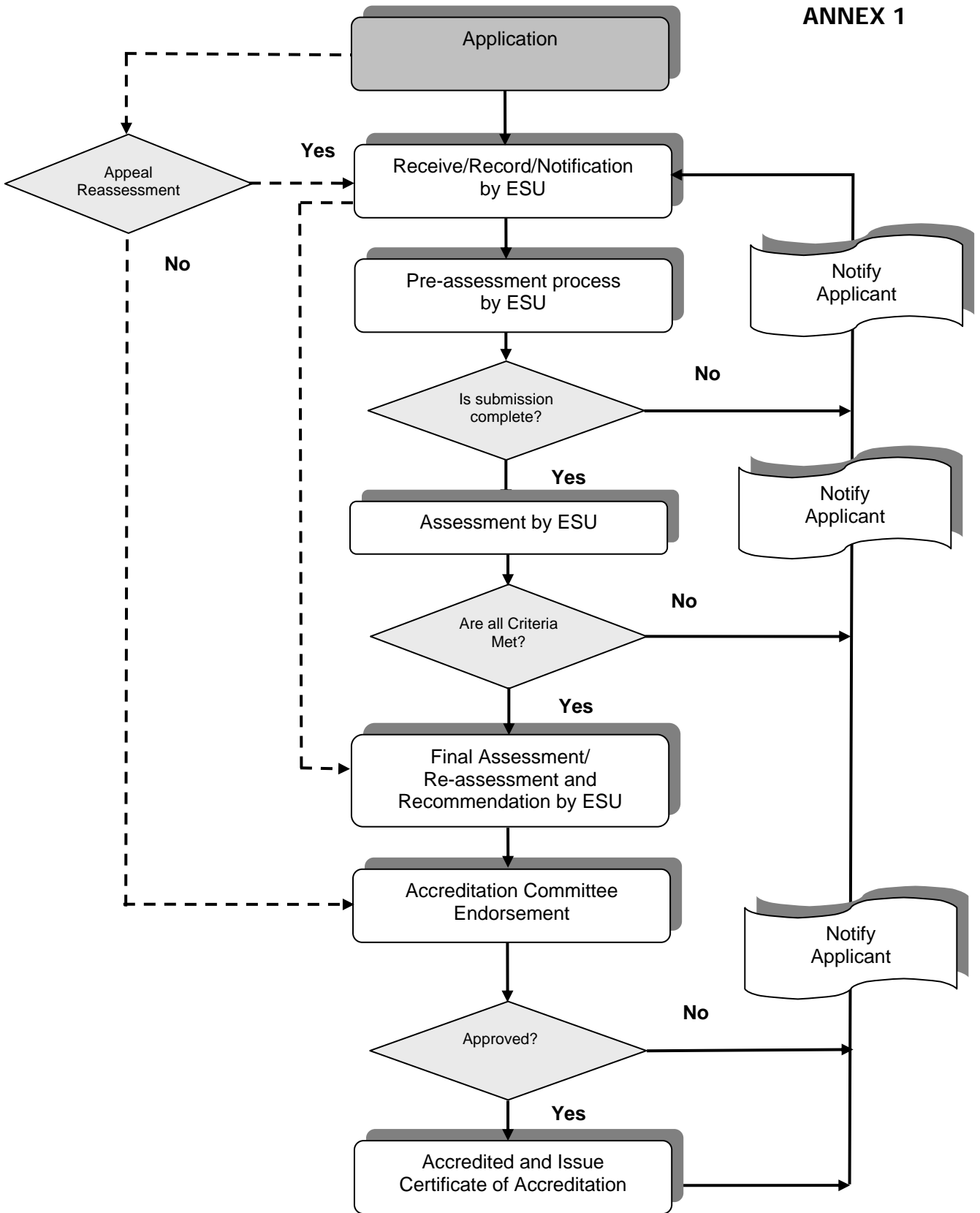
#### 6.8 Register of Accredited ESCO (Auditing Services)

The Register of Accredited ESCOs Companies (Auditing Services) will be made public and available for use by various private and public organizations and agencies in selecting and engaging ESCOs to submit proposal for particular energy efficiency work or project.

### **7.0 Further Information**

Any inquiry or clarification with respect to an application must be made in writing to the ESU at the same address as for the submission of application.

**ANNEX 1**



**Assessment Procedures Flow Chart**

**APPLICATION FORM**  
**APPLICATION FOR ACCREDITATION AND REGISTRATION OF ENERGY SERVICES**  
**COMPANY (AUDITING SERVICES)**

**General Information**

Please read the Application Guidelines before completing this form. Forward the completed Application Form and other related documents with the appropriate fee in the form of a cheque to:

**Energy Services Companies (Auditing Services) Accreditation**  
**c/o Energy Sustainability Unit, Block SDE1 Level 3, Department of Building,**  
**School of Design and Environment National University of Singapore,**  
**4 Architecture Drive, Singapore 117566**

The cheque should be made payable to the *National University of Singapore*.

Purpose of Application \*:      New Application     Renewal

Type of Application\*      :      Full       Provisional

1.      Name of Company:

\_\_\_\_\_

2.      Type of Company \*:      ESCO       In-house Audit Team

3.      Date of Incorporation: \_\_\_\_\_

4.      Contact Details

a.      Business address:

\_\_\_\_\_

b.      Telephone No: \_\_\_\_\_

c.      Fax No: \_\_\_\_\_

d.      Email Address: \_\_\_\_\_

e.      Website (if any): \_\_\_\_\_

5.      Contact for further information:

Management: \_\_\_\_\_

Tel: \_\_\_\_\_

Technical : \_\_\_\_\_

Tel: \_\_\_\_\_

[\* Tick the appropriate box]

6. Level of accreditation applied for <sup>+</sup>: Level II  Level III

7. Accreditation for Facility Type <sup>+</sup> :

General  Building  Industrial  System/Others

For System/Others , please give details:\_\_\_\_\_

[<sup>+</sup> Applicant may tick either or both boxes where applicable]

### **Other information**

Complete the Key Qualified Personnel Information Form as indicated in Annex 3 of the Application Guidelines.

Previous Energy Auditing Services Projects Form as indicated in Annex 4 of the Application Guidelines.

List of Equipment and Instruments Form as indicated in Annex 5 of the Application Guidelines.

Written information as indicated in Annex 6 of the Application Guidelines.

### **Declaration**

1 I, the undersigned, hereby apply for the registration as an Accredited Energy Services Company (Auditing Services) with ESU and certify that, to the best of my knowledge, the particulars given in this application and all accompanying documents/declarations are true and correct.

2 I hereby authorized the ESU to make direct enquiries and references to any person, firm, public officer or organization named in the application to verify the information submitted herein or relating to the competence and general reputation of my organization.

3 I will make my representative or myself available to be interviewed as and when required by ESU at a time agreed by both parties with respect to my application for accreditation.

4 I have clearly indicated that all information rendered is to be treated in the strictest confidence.

5 I further agree that in the event that my organisation is found to be in breach of any code of conduct/practice, the ESU reserves the right to either suspend or withdraw my accreditation from the Register for a period determined by the ESU.

_____ Signature of Authorized Person	_____ Authorized Person's Full Name
_____ Designation	_____ Name of Company and Stamp
_____ Date	
_____ Signature of Witness	_____ Witness' Full Name
_____ Designation	_____ Name of Company and Stamp
_____ Date	

<b>FOR OFFICAL USE</b>	
<b>Remarks:</b>	
<b>Recommendation</b> : Approved/Not Approved <b>Type of Accreditation:</b> Provisional/Full <b>Level :</b> Level II <input type="checkbox"/> Level III <input type="checkbox"/> <b>Category :</b> General: <input type="checkbox"/> Building: <input type="checkbox"/> Industry: <input type="checkbox"/> System/Others: <input type="checkbox"/> Specify : _____ <b>Accreditation Period</b> : _____ to _____ <b>Date of Approval:</b> _____	
Cheque No:	Date Received:
Amount (\$\$):	Received by:

**KEY QUALIFIED PERSONNEL  
INFORMATION FORM**

The Applicant shall indicate the qualification of key personnel who will be responsible for a number or all the energy auditing projects for the Applicant.

The Applicant may submit information on any number of their key personnel they deemed necessary. Additional pages of this form may be prepared and submitted for evaluation if required.

Applicant shall note that certified true copy of the following documents are to be submitted with the Application:

- Academic and other relevant certificates
- Professional membership/technical associations certificates
- 3 Client's reference letter from the list of completed projects (implemented) as indicated in your application.

The client's references should include information such as the actual savings achieved, payback period and whether they are satisfied with the services rendered by the KQP etc.

The references should be printed with the client's company letterhead and signed by the client's authorised person.

Note:

Each work/project should not be listed by more than one KQP from the same Applicant.

1. Name: \_\_\_\_\_
2. Age: \_\_\_\_\_
3. Nationality: \_\_\_\_\_
4. NRIC/EP No: \_\_\_\_\_
5. Designation: \_\_\_\_\_
6. Academic Qualification:
  1. \_\_\_\_\_
  2. \_\_\_\_\_

7. Other specific qualification on energy related subjects (If any)

\_\_\_\_\_

8. Membership of Professional and/or Technical Associations

1. \_\_\_\_\_

2. \_\_\_\_\_

9. Employment Record

<b>Period From/Till</b>	<b>Name of Company</b>	<b>Position Held</b>	<b>Responsibilities and Experience</b>

10. Previous and Current Project Works

Project Period From/Till	Project Title/Location	Name of Client/Address/ Contact Info	Level of Audit	Scope of Works	Status of Project

**Note:**

For Items 9 and 10, Applicant may provide detailed information on separate sheets if the space provided is not adequate.

<b>LIST OF ENERGY AUDITING PROJECTS COMPLETED BY THE APPLICANT</b>
--

	Project Title/KQP Assigned	Name of Client/Address/Contact Info	Project Cost \$\$	Type/Level of Audit	Outcome/Follow-up/Saving Achieved (against guaranteed saving)	Documents/Report/Attachment
1						
2						
3						
4						
5						
6						
7						

**Note:**

Additional sheets may be attached if the space given is not adequate to insert the required data. The submitted form must have the essential information similar to the above form.



**INFORMATION TO BE SUPPLIED**

Please attach to the Application Form the following written submissions:

- 1) Management Organization  
Details of Director/s, Partner/s, Manager/s and Senior Staff providing names, position, qualification, experience and other firms with whom they are currently associated;
- 2) A copy of Business Registration certificate;
- 3) Audited Annual financial (profit and loss) statements and balance sheet for the last two (2) years and certified statement of capital net worth;
- 4) Details of key qualified personnel qualifications and experiences including up-to-date CV's;
- 5) Key personnel membership of professional and/or technical associations ; and
- 6) Past projects and customer references including cost/ cost saving achieved (against guaranteed saving).

*Please forward your feedback or inquires to :*

**Energy Sustainability Unit**

Department of Building  
School of Design and Environment  
National University of Singapore  
4 Architecture Drive, Singapore 117566

**Tel** : (65) 6874 4082/4083  
**Fax** : (65) 6773 3837  
**Email** : [bdgleese@nus.edu.sg](mailto:bdgleese@nus.edu.sg)  
**Website** : <http://www.esu.com.sg>