AFSEC

GUIDE FOR ESTABLISHMENT OF ELECTROTECHNICAL CONFORMANCE TEST LABORATORIES

AFSEC GUIDE 10: 2024
First edition

The project leader, Kuta Omar – AFSEC 2nd Vice President & ACAC Chair, appreciates the contributions made by all and the final editing team with support from PTB, Leon Drotsche (PTB Expert) and Francois Ahoti (IEC Regional Director for Africa : IEC-AFRC) to create this AFSEC Guide for the **Establishment of electrotechnical conformance test laboratories**.

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Initiative supported by

german cooperation
DEUTSCHE ZUSAMMENARBEIT

PTB
Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

PART TWO

GUIDE FOR ESTABLISHMENT OF ELECTROTECHNICAL CONFORMANCE TEST LABORATORIES

Contents

AFSEC Foreword

The African Electrotechnical Standardization Commission (AFSEC) was established inter alia to improve the wellbeing of the African population, mainly by the promotion, development and application of harmonized standards on the entire continent in order to improve access to electricity. To achieve these objectives, AFSEC has the mission to:

- Identify existing standards and prioritize the needs of members of AFSEC with regard to standardization;
- Harmonize the existing standards, by adopting international standards, or in case of need, adapting them to the African conditions;
- Identify in case of need, the draft standards to be considered by the members of AFSEC for the purpose of adopting them;
- Make recommendations on the harmonized standards for their application by relevant Regulatory bodies.

AFSEC through the harmonization of standards and conformity assessment procedures contribute to the broad ambitions of the Africa Free Continental Trade Area (AfCFTA) with its role mentioned in Annex 6 of the AfCFTA agreement on Technical Barriers to Trade (TBT) to overcome the technical barriers between African countries.

Up to August 2019, 17 Countries out of 54 had established National Electrotechnical Committees (NECs) and became statutory members of AFSEC (Cote d'Ivoire, Democratic Republic of Congo (DRC), Egypt, Ethiopia, Ghana, Guinea, Kenya, Namibia, Nigeria, Rwanda, Senegal, South Africa, Sudan, Tunisia, Uganda, Zambia, Zimbabwe).

In 2014 AFSEC established a Standards Management Committee (ASMC) for the management of the AFSEC Technical Committees (ATCs) and a Conformity Assessment Committee (ACAC). AFSEC CA programs are associated with International Electrotechnical Commission (IEC) and International Organization for Standardization (ISO) with African Organisation for Standardisation (ARSO).

The ACAC has the task of guiding conformity assessment activities of electrotechnical products or services in accordance and in liaison with other international bodies or possibly partner organizations for matters of Conformity assessment (CA). AFSEC collaborates with IEC and promotes IEC CA systems, IECEE CB test certificates and CB test reports.

The ACAC takes all the measures deemed necessary to promote and facilitate the activities of AFSEC in the field of Conformity Assessment, included in their Action Plan was development of a Conformity Assessment Guide Part I and Part 2

Guide Part 1 serves as a framework to harmonize initiatives by various countries for conformity assessment (CA) systems in the African Continent and intended to provide a path for regulators to institute minimum requirements for electrotechnical products used in AFSEC member countries. AFSEC member counties and their regulators are able to enforce (through regulation) compliance of products and services with the standards recommended for adoption by AFSEC and demonstrate compliance with these standards through conformity assessment activities.

Guide Part 2 will facilitate cooperation between laboratories and other bodies, and assist in the exchange of information and experience, and in the harmonization of standards and procedures. The acceptance of results between countries is facilitated if laboratories conform to this document.

Scope of AFSEC Conformance Assessment GUIDE Part 2

This guide contains basic components, steps to be followed to build ISO/IEC 17025 compliant laboratories and Requirements for operating, maintaining an ISO /IEC 17025 compliant testing Laboratory (management requirements, technical requirements)

This guide covers the steps to be undertaken for the establishment of an electrotechnical products testing laboratory. It also outlines the process of accreditation under ISO/IEC 17025 standard.

This guide specifies the general requirements for the competence, impartiality and consistent operation of laboratories in the African continent and will also focus on specific case studies in South Africa, Egypt, Senegal and Kenya.

Examples of electrotechnical products and subsystems include: household appliances, power tools, lighting products, alternative power sources, solar lanterns and electrical components such as plugs, adapters, and switches. A further list of products can also be found under the IECEE 23 categories of components. (www.iecee.org)

1 References

The following referenced documents are required in the application of this guide. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies:

a. Guidelines for developing countries on establishing conformity assessment test laboratories in different regions by ITU -May 2012.

b. Conformity Assessment for Developing Countries - Guidelines- CA guide IEC 2008

c. General requirements for the competency of testing and calibration laboratories-ISO/IEC 17025

d. ISO/IEC Guide 98-4: Uncertainty of measurement Part 4: Role of measurement uncertainty in conformity assessment

e. ISO/IEC Guide 99: International vocabulary of metrology — Basic and general concepts and associated terms (VIM)

f. ISO/IEC Guide 98-3: Uncertainty of measurement Part 3: Guide to the expression of uncertainty in measurement

g. ISO 21748: Guidance for the use of repeatability, reproducibility and trueness estimates in measurement uncertainty evaluation

h. ISO 5725 Series: Accuracy (trueness and precision) of measurement methods and results

i. ISO/IEC 17043: Conformity assessment — General requirements for the competence of proficiency testing providers

j. ISO/IEC 17020: Conformity assessment — Requirements for the operation of various types of bodies performing inspection

k. ISO/IEC 17065: Conformity assessment — Requirements for bodies certifying products, processes and services

l. ISO 19011: Guidelines for auditing management systems.

m. Setting up an electrical testing laboratory in a developing country (IEC – UNIDO Publication)

2 Objective of the guide

This guide has been developed with the objective of promoting confidence in establishing and consistent operation of credible laboratories. This document contains requirements for laboratories to enable them to demonstrate they operate competently, and are able to generate trustworthy and valid results.

3 Government Policy on Conformity Assessment

The Government policy on conformity assessment provides the overall framework and direction for establishing, strengthening and maintaining the national electrotechnical test laboratory system in accordance with the provisions of an Act or Statutory Instrument under a government ministry Such policy should be aligned with the African Quality Policy (AQP) and the respective national quality policies.

The National Policy provides the framework for developing the National Strategic Plan for the Electrotechnical Test Laboratory Services.

The National Policy defines minimum standard specifications for the requisite test laboratory infrastructure for the specified scope of testing services; and addresses the organizational and management structure, regulatory mechanisms, human resource requirements, and all required support services, within the context of each country's electro-technology national conformity assessment priorities and electrotechnical testing services delivery system.

Consumer protection legislation

Setting up an electrical testing laboratory in an environment that has no safety or consumer protection legislation only makes sense if the laboratory can initiate a legislative process in the country. The laboratory has to work with governmental agencies, legislators and regulators, explain to them what needs to be done, and have some regulations put in place.

Any scheme to improve consumer safety must always be established on a solid base. The laboratory should find out which products are potentially dangerous, what kind of accidents can happen and any other potential hazards.

4 Laboratory

4.1 Electrotechnical Test laboratories in general

Laboratories are generally required to assess the status of conformance and interoperability of **electrotechnical products** imported into a country or region. This ensures order in the marketplace, encourages competition and gives confidence to consumers and all stakeholders that the product is safe. Establishment of laboratories also fosters capacity building both on expertise and facilities and provides a business opportunity for the industry.

4.2 Laboratory for type approval testing

A product is certified to meet certain requirements for its type. Type approval is granted to a product that meets a minimum set of regulatory, technical and safety requirements based on test results derived from representative sample. Type approval promotes level play field in market access and assures and maintains the confidence of suppliers, importers, end users and new technology developers.

A type approval test laboratory is needed most where there is:

a. Dissatisfaction and complaints among stakeholders.

b. Health and Safety risk

c. Regulatory requirements.

d. Suspected dumping of substandard products in the marketplace.

e. Importation and deployment of counterfeit products.

A test laboratory determines whether the test requirements are within its scope of testing and determines the characteristics of a product. The characteristics are then evaluated against the requirements of a standard and the laboratory produces a test report or certificate with results. The testing can be destructive or non-destructive.

Conformance testing.

Hierarchy of a approval process which results in a product being ready for the marketplace.

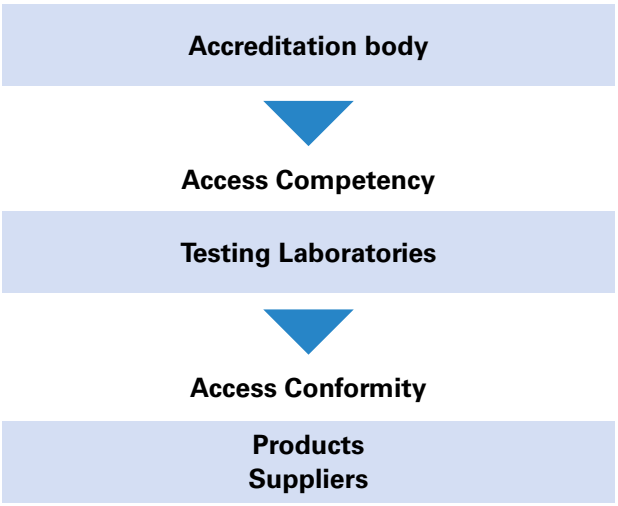


Fig. 1: Hierarchy of type approval testing

An alternative to this hierarchy is the utilisation of the peer assessment process as used by IECEE to qualify IECEE CB testing laboratories.

5 Building ISO/IEC 17025 compliant testing laboratories.

5.1 Legal status

The laboratory shall be a legal entity, or part thereof, that can be held legally responsible for its laboratory activities.

5.2 Financial management

The laboratory shall have financial stability and the necessary resources for its operations. There is need to develop plans to secure both medium- and long-term funding for the laboratory activities. A commitment from government or top management of the organization to provide long term support is essential for a successful laboratory.

5.2.1 Revenue and Expenses

Laboratories generate revenue by performing tests and other services they offer. On the other side, laboratories incur expenses, for staff salaries, equipment, supplies like consumables, as well as other operational overhead costs. The ability to produce a profit sits in the balancing of the revenue and the expenses and is therefore a fundamental aspect of financial management.

5.2.2 Overhead costs for a testing laboratory

They should include as a minimum where relevant the following:

a. Salaries of employees, including laboratory technicians, engineers and administrators.

b. Insurance costs to protect laboratory against risks such as accidents, fires and data loss.

c. Costs for laboratory space, including premises and equipment.

d. Maintenance costs for laboratory equipment, such as testing machines and computers.

e. Transportation costs for samples and equipment sent to other laboratories for further testing.

f. Training costs for employees to stay up to date on the latest testing techniques and methods.

g. Communication costs such as telephone and internet bills to stay in touch with your customers and partners.

h. Licensing fees for software specific to laboratory, such as data processing and simulation programs.

i. Marketing costs to promote laboratory and attract new customers.

j. Maintenance and cleaning costs to maintain a clean and safe environment for employees and equipment.

k. ISO/IEC certification costs

This list is not exhaustive and may depend on the business model.

5.3 Management Structure

There is need to have a distinct laboratory management structure headed by an officer with the requisite responsibility and authority for the day-to-day management of the laboratory.

This will ensure that the adopted structure does not lead to conflict of interests which may negatively influence compliance with ISO/IEC 17025.

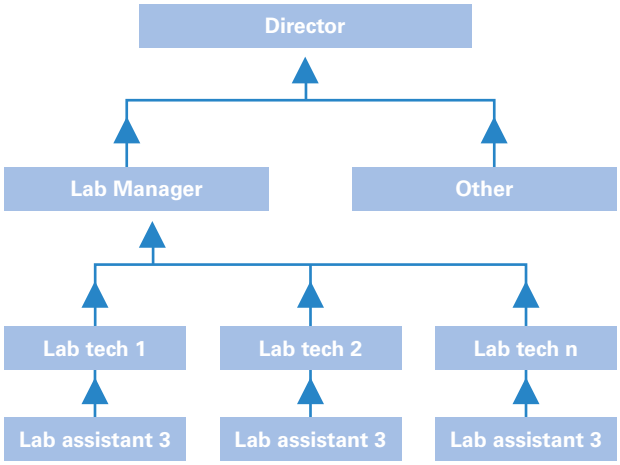


Fig 2: Typical management structure

5.4 Personnel recruitment, training and retention

Staff recruited should have the theoretical training and adequate practical experience for the identified functions of the laboratory. Secondment in a working laboratory for some duration to gain experience maybe necessary.

Competence requirements should be documented for each function influencing the results of the laboratory activities. Competence requirements should include relevant education, qualification, training, technical knowledge, skills and/or experience.

The laboratory should ensure that each function influencing the results of the laboratory activity is performed by a competent person.

A training programme must be put in place to train new staff and keep staff up to date with technological changes and evolution. The laboratory needs to have renumeration packages and other incentives to retain its trained staff. Retention of highly skilled personnel will positively impact the long-term sustainability of operations.

5.5 Laboratory premises

The location of the laboratory should be in an electronic 'quiet area to minimize electronic interference and there will be separation between neighbouring areas whose activities are incompatible, e.g., office and laboratory spaces or Temperature testing and Electrical testing spaces.

Access to the laboratory should be controlled by using a documented access control system.

There should be proper orientation/screening of the windows to avoid direct sunlight to protect sensitive equipment.

Environmental conditions (temperature, humidity) in the laboratory should be strictly controlled and the premises should have a backup guaranteed continuity of electrical supply especially where test equipment are located.

Establish, if necessary, a climatic chamber. This is a temperature and humidity chamber where products are placed for 48 hours to see how they react to different climatic conditions. Keep in mind that certain tests are interlinked—some products need to go to the climatic chamber before other tests can be performed.

In addition, establish, if required, a ventilated and insulated area for flammability testing.

5.6 Laboratory equipment

Test equipment is one of the most important assets of a laboratory. Proper due diligence in purchasing decisions related to specialized equipment to conform to specifications relevant to the tests being offered by the laboratory.

Other criteria include:

a. Reputation of the manufacturer, supplier or vendor of the equipment;

b. Clearly stipulated Warranty and guarantee periods for equipment;

c. availability of maintenance;

d. technical support and calibration facilities either locally, regionally or from the manufacturer/supplier;

e. provision of installation / training services and

f. whether the design, development and manufacture of the equipment is undertaken in a quality system environment such as ISO quality management systems (QMS) and related AFSEC technical standards.

Generally, it is best to start with a limited amount of equipment to test a limited number of products. It is impossible to do everything from day one. Services can grow when the basics have been acquired and the staff is comfortable handling the equipment and performing the tests. Having a limited amount of equipment to begin with will also make it easier to learn how to use it.

When the equipment is delivered to the laboratory, it is important to start using it immediately.

5.7 Accreditation

Accreditation is voluntary; therefore, the Laboratories have a leeway to make decisions leading to accreditation.

Some of the benefits of accreditation to a laboratory include:

a. Global acceptance of its test reports;

b. Recognition of its services by the internationally recognized Product Inspection and Certification Bodies.

c. An increase in its business/services due to confidence building and the authenticity of its test results.

d. Reduce the overall conformity assessment costs for export products for the country/region.

5.7.1 Steps to accreditation

STEP 1:
Decision Making-The scope of Accreditation

The laboratory should create a team to:

a. define the scope of Accreditation

b. learn the ISO/IEC 17025 requirements

c. estimate costs

d. get top management approval

STEP 2:
Decision Making-accreditation Body

The criteria to be used in selection of an accreditation body includes:

a. Proximity to the country if none is available in the country

b. language

c. accreditation costs

d. accreditation body shall be a signatory of International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Agreement (MRA) or a member of regional cooperation bodies recognized by ILAC

STEP 3:

Once a decision has been made on step 2 and step 3 above, application is then submitted to the Accreditation body along with the fee for the initial assessment.

STEP 4:
Preparation

a. A documented quality system to be established generally in line with ISO/IEC 17025.The QMS must have a Quality Manual and Quality Management procedures.

b. Training of staff

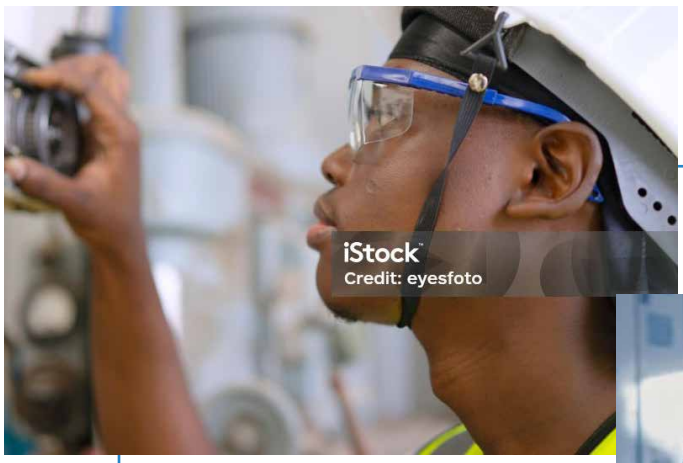
c. Internal audit and corrections

STEP 5:

Once accreditation body accepts Accreditation; the date of assessment will be fixed on mutually agreed dates.

STEP 6:
Accreditation

Granting of accreditation upon satisfactory discharge of all non-compliances raised during assessment.



Partner/Mentor laboratory

It is invaluable for a new laboratory to have a partner laboratory that is prepared to be of assistance and that has an emotional and moral involvement in doing so. Some established laboratories are prepared to take on this role—they can see that the partnership will bring long-term mutual benefits, with business flowing both ways—and they can also help with staff training.

A partnering laboratory may also assist with additional tests that require more sophisticated equipment. As the laboratory grows and acquires more equipment, it can, step by step, take over all the testing from the partner laboratory.

International Standards and conformity assessment

The IEC offers new laboratories a number of valuable benefits. Its International Standards are widely used and adopted at the national level in IEC member countries. Countries participating in the IEC Affiliate Country Programme, aimed at developing countries, are entitled to receive 200 free IEC International Standards for national adoption. Using existing standards as a basis can be a great advantage, financially and technically, when setting up a laboratory.

The TRFs (Test Report Forms) in the IECEE CB Scheme can be purchased and downloaded from the IEC Webstore, saving the new laboratory time by allowing it to use existing TRFs from day one.

The IECEE CB Scheme also runs a proficiency programme involving more than 100 laboratories, where each laboratory can compare its performance with the others. All do the same testing. A laboratory can participate in proficiency testing even before it is fully set up, by starting with a limited number of tests. These comparisons offer a good measure of where the laboratory stands among its peers, and give it the opportunity to develop contacts with IECEE testing laboratories

Getting started

When all the preparatory steps have been taken and the products to be tested are defined preferably a short list of products that are most popular with consumers, the work of the laboratory can begin.

Start with market surveillance activities: go out into the market, bring some products back to the laboratory and test them. This will also be a good learning experience for the laboratory's engineers and technicians.

Market surveillance also helps importers, especially in economies that import most, if not all, of their products. Importers have a duty of care and due diligence for the products they bring into the market but can be hindered by the inadequate documentation they receive from suppliers. Conducting market surveillance is a good way to verify that imports meet safety requirements – and helping importers and dealers improve their products is ultimately beneficial to consumers.

6 Process requirements

The laboratory shall establish, document, implement and maintain a processes system that is simple, transparent, effective and relevant to the activities it seeks to undertake. The system shall promote openness so as to inspire confidence in its customers.

The requirements for operating/maintaining an ISO /IEC 17025 compliant testing laboratory shall be implemented with the corresponding sub clauses from clause 7 of ISO/IEC 17025:(E)

The main topics covered in this clause 7 is:

a. Review of requests, tenders and contracts

   Note: where external providers are used, the requirements of 6.6 in ISO/IEC 17025 are applied and the laboratory advises the customer of the specific laboratory activities to be performed by the external provider and gains the customer's approval.

b. Selection, verification and validation of methods

c. Sampling: The laboratory shall have a plan and method when it carries out sampling of substances, materials or products for subsequent testing or calibration. The sampling method shall address the factors to be controlled to ensure the validity of subsequent testing or calibration results. Sampling plans shall, whenever reasonable, be based on appropriate statistical methods.

d. Handling of test or calibration items

e. Technical records

f. Evaluation of measurement uncertainty

g. Ensuring the validity of results

h. Reporting of results

i. Complaints

j. Nonconforming work

k. Control of data and information management

l.

7 Management system requirements

The management system requirement shall be implemented with the corresponding sub clauses from clause 8 of ISO/IEC 17025: 2017 (E).

The main topics covered in this clause 8 is:

Options

The laboratory shall establish, document, implement and maintain a management system that is capable of supporting and demonstrating the consistent achievement of the requirements of this document and assuring the quality of the laboratory results using the proposed options A or B.

For Option A

As a minimum, the management system of the laboratory shall address the following:

- management system documentation (see 8.2);
- control of management system documents (see 8.3);
- control of records (see 8.4);
- actions to address risks and opportunities (see 8.5);
- improvement (see 8.6);
- corrective actions (see 8.7);
- internal audits (see 8.8);
- management reviews (see 8.9).

For Option B

A laboratory that has established and maintains a management system, in accordance with the requirements of ISO 9001, and that is capable of supporting and demonstrating the consistent fulfilment of the requirements of Clauses 4 to 7, also fulfils at least the intent of the management system requirements specified in 8.2 to 8.9.

Annex A:

Database template of Electrotechnical Test Laboratories in the Africa Continent

Template of Test Laboratory Information to be captured by AFSEC members.

(Template is also available on AFSEC Website).

Country:	
City:	
Lab Name:	
Website/Location:	
Lab. Accreditation Number (if any):	
Product (testing sample) name:	
Testing Type	
Environmental	
Electro Magnetic Compatibility	
Safety	
Performance	
Protection	
Energy Consumption	
Others	
Reference Standard	
IEC	
IEEE	
EN	
ISO/IEC	
UL	
National Standards	
Test procedure or Catalogue	
Test Parameters	
Current	
Voltage	
Power	
Resistance	
Temperature	
Pressure	
Insulation	
Lumen	
Others	

Annex B:

Case studies of Electrotechnical Test Laboratories in African Continent

The following are case studies of laboratories (labs) developed in Egypt, Kenya, South Africa and Senegal with main information topics:

Policy, Feasibility study, Start-up phase, Facility, Equipment purchases decision, Business Operations, Accreditation process, Funding, Relationships building, Constraints and Success factors for the project, etc.

Case Study 1: Egypt

Ministry of Electricity & Renewable Energy, New & Renewable Energy Authority (NREA)
In 1986 New & Renewable Energy Authority (NREA) was established to act as the national focal point for expanding efforts to develop and introduce renewable energy technologies to Egypt on a commercial scale together with implementation of related energy conservation programs. NREA is entrusted to plan and implement renewable energy programs in coordination with other concerned national and international institutions within the framework of its mandate.

NREA Testing Laboratories (Labs)

1. Testing labs for testing PV modules and solar water heaters.

2. Testing labs for testing energy efficiency of home appliances.

Government Policy
Egypt has set an ambitious target of generating 42% of its electricity from renewable resources by 2035. To achieve this target, Egypt implemented the following policy mix:

- feed-in tariffs to attract investors
- Competitive biddings
- BOO - Build/Own/Operate is for a funding scheme adopted by NREA that allows the investor to build the plant and operate it for a certain period of time then return back the Land to the Government at the end of this period, according to a usufruct agreement.

Feasibility study
NREA did a feasibility study for upgrading the existing testing facilities for testing Photovoltaic (PV) modules and Solar water heaters in 2015. The upgrading of these laboratories would help the investors to test their products in Egypt and ensure the quality of the products.

Start-up phase
NREA hired an international consultant to help in preparing the tender document taking into account the newest and latest technologies used for manufacturing the PV modules and solar water heaters. Using the tender document an international tender was issued to establish the testing facility.

Facility
NREA decided to establish the laboratories in its premises in Cairo. All the testing requirements was taken into consideration and added into the tender document including the environmental conditions.

Equipment decisions
Terms of reference documents were prepared with an international consultant in order to be according to the latest international standards and latest technology of manufacturing PV modules and Solar water heaters.

Business Operations
A training program was done for NREA staff abroad in similar international laboratories in order to increase the experience and capacity buildings.
Also other training courses was done during the installation of the specialised test equipment.

Accreditation process

- EGAC (Egyptian Accreditation Council) is the entity which is responsible for the accreditation in Egypt.
- All the documents required for accreditation were prepared according to ISO 17025 standard.
- The laboratories have had accreditation since 2019.
- There were some challenges faced with the accreditation process and the main challenges were that the testing laboratories were new technologies and all the testing equipment were unique. The accreditation thus took more time in order to review and prepare all requirements as per the ISO17025 standard.

Funding
The labs were funded from the European Union with a budget of about 2.5 million Euro.

Relationships building

- The new laboratories were an important arm for the government in applying the strategy of the government and Ministry of Electricity strategy and targets of increasing the share of renewable energy in the energy mix.
- The testing of products is used to control the market and prevent bad quality equipment to enter the Egyptian market. The test labs also helped the investors to test their goods in Egypt.
- Constraints and Success factors for the project.

There were some constrains that faced the implementation of the project like:

- The technology was new.
- The budget was limited.

There were some success factors:

- More related skilled staff.
- The good cooperation of EGAC staff.

Case Study 2: Kenya

Company/Lab
Associated Battery Manufacturers Kenya Ltd.

Scope
Testing of raw materials, production in process samples and finished products for Lead acid batteries.

Feasibility study
Gap analysis was conducted to establish the required infrastructure.

Start-up phase.
Priority of testing was on raw materials, production in process samples and finished products.

Facility
The lab is located within the organization premises in a quite environment.
Suitable environmental conditions have been established and validated. The parameters are monitored on a regular basis.

Equipment decisions
The choice of equipment was based on the range of measurements required to be done for the various parameters in the related standards.

Business Operations
The new laboratory was established with personnel, facilities, equipment, system and support services necessary to perform its activities.

Accreditation process
Gap analysis was conducted to identify areas for improvement and necessary measures were taken to address the identified gaps.
Initial assessment was conducted by the accreditation body.

Challenges
Unavailability of proficiency test providers for some parameters within the country.

Mitigations
Source for the suppliers of the Project Team services outside the country.

Funding
The test lab was established using internal financial resources.

Relationships building
The various stakeholders were engaged through assessments, supply of good and services. Government agencies with inter-laboratory capabilities were used on testing.

Constraints and Success factors for the project
Financial Constraints-Accreditation cost is high particularly for labs that are not commercial.
Enhanced customer confidence on products and test results.

Case Study 3: South Africa

The case study was done using the South African Bureau of standards electrotechnical testing laboratories as an example.

Government Policy
Act 19 of 2006, to provide for an internationally recognized and effective accreditation and monitoring system for the Republic of South Africa by establishing SANAS SA juristic person, to recognize SANAS is the only accreditation body in the Republic of South Africa for the accreditation of conformity assessment and calibration and monitoring of good laboratory practice, end to provide for matters connected therewith.

Note: The above-mentioned act is the act that is in relation to the national accreditation body in South Africa called SANAS.

Feasibility study
The feasibility study was conducted when setting up a testing laboratory and it is done to support industrialization in the country, and to provide third party conformity assessment services for the general public/consumers.

Start-up phase
This was done in view of the products used by the public and they need to confirm the safety and reliability of these products. Also, there is a regulatory body in South Africa, called national regulator for compulsory specifications (NRCS) requires that these products are tested to ensure conformance with their relevance standards.

The following are the types of electronical laboratories that were set up

- Lighting technology laboratory -Testing of lighting products.
- Rotating machines lab -Testing of power tools and rotating machines.
- Electronics and appliances lab -Testing of household appliances, electromagnetic. compatibility, electricity meters and office equipment.
- NETFA -Testing of electric cables,Transformers, switch gears, plugs and sockets.

Facility
All the testing laboratories mentioned above, were built in locations that are suitable for testing. For instance, NETFA was built next to a Utility Substation and obtains its electricity from that power station because of the high current it requires for testing.

Equipment decision
Testing equipment that are used by the lab, are purchased according to the requirements of the standards for testing. In some cases, the IECEE conformity assessment system, under the committee of testing laboratory, does specify the type of equipment to be used for testing Standards (adopted from IEC).

Business Operations

Financial - The laboratories generate revenue from the testing activities.

Marketing – Marketing/advertising of testing laboratory services are done through social media and exhibitions.

Operations - testing activities are conducted by trained personnel, using testing equipment and methodologies.

ICT systems - The software, called laboratory integrated management system (LIMS), is used to generate and store, quotations, test reports and other information related to the customers.

Receiving - Test samples are received through a central point and are inspected and registered and then distributed to the relevant testing laboratory for testing.

Accreditation process

CAB - Conformity Assessment Body

ASSESSMENT TECHNIQUES	PURPOSE	WHEN IS THIS DONE
Document reviews	To evaluate whether the conformity assessment body's (CAB) system conforms to the relevant standard(s) and other accreditation requirements.	On receipt of an initial application for accreditation
On-site visits to the CABs and other sites where the CAB performs testing.	To determine, through the gathering of objective evidence, whether the CAB is competent and conforms to the relevant standard(s) and accreditation requirements, and where applicable regulatory and legal requirements.	
Witnessing Activity or Vertical Assessment	To determine whether: • Documented procedures are being followed; • Staff have the skills required to perform scope of accredited work or for which accreditation is sought; • The training and supervision provided is effective; • The resources available are adequate; • Any defects in the equipment have been detected and addressed; and • answers to questions asked can be supported.	Pre-assessment
Review of performance of proficiency testing or other interlaboratory comparisons	To confirm that the CAB monitors the validity and reliability of test results through the review of results, detection of trends and implementation of appropriate corrective actions.	1) Prior to an on-site initial assessment and reassessment 2) As a sampling exercise during the on-site assessment
Interview	**Lab Personnel** To confirm that personnel are knowledgeable and competent in the performance of their duties.	Testing lab
ASSESSMENT TECHNIQUES	**PURPOSE**	**WHEN IS THIS DONE**
Interview	**Technical Signatories (TS)** To confirm the competence and suitability of the TS: understands significant issues in the test, etc. processes; is able to critically evaluate results; takes responsibility for the adequacy of results; understands the requirements for accreditation and the scope of accreditation held/sought; understands accreditation and standard requirements.	As part of the assessment process
Remote Assessments	An assessment is carried out using electronic means. The use of remote assessment is evaluated on a case-to-case basis for effectiveness. The structure of a remote assessment is similar to that of an on-site assessment.	-

Funding
The South African Bureau of standards is a state-owned enterprise, and it stablished a commercial entity which conducts testing and certification and it generates revenue from testing and certification activities, it also receives a portion of government grants as part of its revenue.

Relationships building
The South African Bureau of standards has a division for stakeholder engagements, this division is mainly responsible for maintaining close relationship with all kinds of stakeholders and to support them with information, donated to standards and conformity assessments that will assist them to carry out their work.

Constraints and Success factors for the project.
Sucessfuly establishing a test laboratory for testing new methods, such as energy efficiency.

Sucessfuly upgrading testing laboratories, with automated testing equipment, for testing LED lights and colour rendering index.

Case Study 4: Senegal

Name of CAB/laboratory
Centre de Test des Systèmes solaires (CT2S).

Website of the organisation
www.ct2s.org.sn

Email
cmkebe@gmail.com / contact@ct2s.org.sn

Feasibility study
The laboratory conducted gap analysis according to the market to establish the requirements of equipment and human resources.

Start-up phase
Tests platforms for quality control was made. This includes the acquirement of tests equipment and also procedures and process were designed.

Facility
The laboratory was established in a building with respective environmental and technical conditions. The number of rooms needed to isolate for the different test conditions was part of the decision.

Regular monitoring is done to make sure that the conditions remain valid.

Equipment decisions
The decision was based on the standards requirements to meet the quality needed for the specialist test equipment for solar panels, inverters, batteries and regulators.

Business Operations
The laboratories have good platforms and dedicated equipment as well as human resources to do business operations.

Accreditation process
Gap analysis is conducted to identify area of improvement and necessary measures needed to take account to address the identified gaps in a sustainable way.

The main challenges are accreditation to ISO17025 standard (quality, metrology and technical process to establish).

Source of mitigation
Have funds to hire support body for the implementation of the ISO/IEC 17025 standard.

Funding
The CT2S laboratory is the result of a partnership between the Ecole supérieure polytechnique de Dakar and the Federal Polytechnic School of Lausanne through the Pv-Lab.

The CT2S initially benefited from funding from Repic (Swiss North-South innovative financing platform) for its start-up phase. The program has also strengthened the technical platform with the funder.

This project also benefited from the support of France and Canada, through the Meridiam and Crdi (Research Centre for International Development) structures, respectively.

Relationships building
Senegal have 3 laboratories in Senegal and others are in the regional and have the potential to do interoperability testing.

Government have created a good environment to develop a good ecosystem to address relationship building.

Constraints and Success factors for the project
Market of testing not well established and this is a very big handicap for the financial stability of the test facilities.

Accreditation costs very high and need support to hire good support for the implementation of the ISO/IEC 17025 standard.

Encourage and lobby government to finish the process for performing test and control quality to be an obligation.

Enhanced confidence of the costumers on the importance of testing for the renewable energy sector is also required.

The above actions will definitely establish the market and assure sustainability of the project