



**AFRICA CENTRE OF EXCELLENCE FOR SUSTAINABLE POWER
AND ENERGY DEVELOPMENT (ACESPED)
UNIVERSITY OF NIGERIA, NSUKKA**

**REPORT ON FEASIBILITY STUDY ON
REGIONAL COMPANIES' TESTING NEEDS**

Administrative Responsibility office:	ACE-SPED regional testing facility
Date which was feasibility study report developed:	March, 2021
Report feasibility study developed by:	ACE-SPED testing facility Committee
Authorized by:	ACE-SPED BOARD
Version:	01
Web link to document	

1.0 Background

To foster research innovation, we conducted a feasibility tour or visit to ascertain the testing needs and capabilities of our regional partners or companies. We used a questionnaire/interview to identify the testing needs and capabilities of these companies.

2.0 Objective of the feasibility study

- i. By identifying the elements that may make the testing laboratory successful, feasibility studies assist ACE-SPED managers in determining the viability of a project or enterprise.
- ii. A feasibility study includes a thorough examination of the requirements necessary to carry out the testing.
- iii. The report may include a description of the new project or product, a market study, the technological and labor requirements, and the sources of funding and capital.
- iv. The report concludes with a definitive decision, accompanied by financial forecasts, a success probability, and additional information.

3.0 Some of the companies and industrial partners visited are:

- 1) Enugu Electricity Distribution Company (EEDC) Enugu (National Partners, Support Letter Received)
- 2) National Center for Energy Research and Development (NCERD) Nsukka (National Partners, Support Letter Received)
- 3) National Power Training Institute of Nigeria (NAPTIN) (National Partners, Support Letter Received)
- 4) Mirai Denchi Inc Japan (International Partners, Support Letter Received)
- 5) Jacobs Engineering Inc London Uk (International Partners, Support Letter Received)
- 6) Cleanergy Global Solutions Ltd (National Partners, Support Letter Received)
- 7) EU-ACP Chamber for Multilateral Cooperation, Vienna Austria (International Partners, Support Letter Received)
- 8) National Stove Eligibility Laboratory (National Partners, Support Letter Received)

- 9) Nigeria Bulk Electricity Trading Company Abuja
- 10) Nigerian Chambers of Commerce and Industry, Japan (NCCIJ) (International Partners, Support Letter Received)
- 11) Project Development Agency (PRODA) Enugu (National Partners, Support Letter Received)
- 12) Lions Science Park (LSP) University of Nigeria, Nsukka
- 13) SCC IMPS Institute for Material Applications and 3D Printing Solutions, Stuttgart Germany (International Partners, Support Letter Received)
- 14) National Integrated Power Project (NIPP) Abuja
- 15) National Center for Equipment Maintenance and Development (NCEMD), University of Nigeria, Nsukka
- 16) Transmission Company of Nigeria (TCN) Abuja
- 17) Energy Commission of Nigeria (ECN) Abuja
- 18) Nigerian Electricity Regulatory Commission (NERC)
- 19) Electronic Development Institute (ELDI)
- 20) Science Equipment Development Institute (SEDI) Enugu (National Partners, Support Letter Received)
- 21) Anambra Motor Manufacturing Company (ANAMMCO) Enugu
- 22) Cutix Cables Plc Nnewi
- 23) Nigerian Breweries Limited (NBL) Lagos
- 24) Nigerian Bottling Company (NBC) Lagos
- 25) UNESCO BIOTEC Center University of Nigeria, Nsukka (National Partners, Support Letter Received)
- 26) Shell Petroleum Development Company (SPDC) Port Harcourt
- 27) Nigerian National Petroleum Corporation (NNPC) Abuja
- 28) Solive Oil Ltd Nsukka

4.0 Outcomes of the **feasibility study**

The **feasibility** study concentrated on identifying technical exchanges or other beneficial enhancements from the issue areas indicated by the survey results.

We conduct interviews and collect survey responses from our regional partners. The table below illustrates the lack of adequate advanced materials testing equipment in many parts of Nigeria and West Africa.

A. Control and Instrumentation Equipment

CE110 Servo Trainer	A compact self-contained bench mounting d.c. servo apparatus designed to allow students at all academic levels to investigate basic and advanced principles of control. In particular the CE110 deals with control issues relating to position and speed control in servo systems
Microgrid	The microgrid combines the outputs of Wind Turbine emulator, PV Emulator and Fuel Cell at a common DC link via different DC-DC converters which is further connected to a three-legged programmable inverter to deliver the combined power to an Actual Grid. Microgrid system enables user to do research in the field of Microgrid management, load side management, priority allocation to renewable sources etc.
Solar PV Grid Tied Training System	Enables user to study wiring and interconnections of different components involved in the system to develop basic understanding of working and operation of a Grid connected system
5kW Wind Emulator	Wind turbine emulator mimics the behaviour of wind turbine for hardware level simulations. This system has a DC motor coupled with the Induction generator/Permanent Magnet Synchronous Generator, speed of which is controlled as per the speed reference calculated by solving the mathematical model of wind turbine. An induction generator is coupled to the DC motor and bidirectional inverter is connected to the terminals of the generator.
B. Advanced Materials Characterization	
AA6000 mini Desktop Scanning Electron Microscope	Scanning electron microscope (SEM) is one of the most widely used instrumental methods for the examination and analysis of micro- and nanoparticle imaging characterization of solid objects. One of the reasons that SEM is preferred for particle size analysis is due to its resolution of 10 nm, that is, 100 Å.
7600 FTIR spectrometer	It is a valuable tool for various analytical applications in fields such as chemistry, medicine, food and beverage, wine industry, material , energy, and power, engineering and quality process control and for examining the functional group
STA 449 F5 Jupiter® Simultaneous Thermal Analyzer (TG-DSC/DTA Apparatus)	The Nano DSC and the Multi-Cell DSC represent ultrasensitive differential scanning calorimeters with unmatched flexibility for characterizing molecular structure and stability. The Nano DSC, with fixed-in-place cells, is specifically designed to analyze in-solution samples. The Multi-Cell DSC offers three removable cells and one reference cell for maximum sample flexibility.
c. RENEWABLE AND NEW ENERGY SYSTEMS	

<p>Elemental Analyser with complete accessories Brand/Model: Perkin Elmer CHNS(O) Specification: Perkin Elmer 2400 Series II</p>	<p>The 2400 Series II offers multiple analysis modes and fast analysis times. Modes Time (Minutes) CHN 6 CHNS 8 Oxygen 4 Productivity and precision are your partners with the 2400 Series II. User-selected calibration procedures of single-standard calibration (multiple linear regression) offer the user increased precision throughout the broad analysis range of the 2400 Series II. Uses: For determination of elemental composition of Organic Liquids</p>
<p>Oxygen Bomb Calorimeter Brand/model: CAL3K-F CALORIMETER WITH MANUAL OXYGEN CAL3K-AP Specification: 3K-F - CAL3K-F BOMB CALORIMETER SYSTEM.</p>	<p>Uses: For determination of Heating value of fuels. The CAL3K-A Oxygen Bomb Calorimeter System can be used with most applications including such as Coal Analysis, Fuel Analysis, Alternative Energy, Waste Analysis, Animal Feed Research, University Research, Food/Nutrition Analysis, Explosives Analysis, Coal Analysis, Oil Analysis, and other traditional and non-traditional applications.</p>

5.0 Conclusions

The feasibility study identified specific test procedures that required changes in the survey and partner interviews. The study also identified areas for improvement in these processes. The interviews provided valuable insights and were quite helpful in pinpointing challenges they had encountered in advanced testing in the region. The committees recommended that if the ACE-SPED BOARD purchases the aforementioned equipment for the ACE-SPED testing laboratories, it will not only establish ACE-SPED as a leader in the region but also solve the issue of transporting the samples overseas for testing.



16/03/2021

Engr. Prof. V.S.AIGBODION

Chairman ACE-SPED testing facility **Committee**