



NATIONAL OCCUPATIONAL STANDARD FOR ENERGY AUDITOR

APPROVING AUTHORITY

This National Occupational Standard has been prepared and published under the authority of the Zambia Qualifications Authority Board on 21st September 2021.

ZAMBIA QUALIFICATIONS AUTHORITY

The Zambia Qualifications Authority Act No. 13 of 2011 was enacted by the Government of the Republic of Zambia to ***“provide for the development and implementation of a national qualifications framework; establish the Zambia Qualifications Authority; provide measures to ensure that standards and registered qualifications are internationally comparable; and provide for matters connected with, or incidental to the foregoing”***. Among other functions, ZAQA is responsible for ***determining national standards for any occupation***, through various sector specific National Occupational Standards Development Teams (NOSDTs).

REVISION OF NATIONAL OCCUPATIONAL STANDARDS

National Occupational Standards shall be revised every after **5 years**, or whenever necessary, by the issue of either amendments or of revised editions. It is important that users of National Occupational Standards (NOS) should ascertain that they are in possession of the latest amendments or editions.

NOS DEVELOPMENT TEAM RESPONSIBLE

This National Occupational Standard was prepared by the Energy National Occupational Standards Development Team, upon which the following organisations were represented:

1. Copperbelt University
2. Department of Energy - Ministry of Energy
3. Energy Regulation Board
4. Kafue Gorge Regional Training Centre
5. Mines Safety Department - Ministry of Mines and Minerals Development
6. Ministry of Labour and Social Security Services
7. Muhanya Solar
8. Northern Technical College
9. Rural Electrification Authority
10. SNV Zambia
11. University of Zambia
12. Zambia Qualifications Authority

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FOREWORD

The Zambia Qualifications Authority (ZAQA) is a statutory body under the Ministry of Higher Education established by ZAQA Act No. 13 of 2011 to “**provide for the development and implementation of a national qualifications framework; provide measures to ensure that standards and registered qualifications are internationally comparable; and provide for matters connected with, or incidental to the foregoing**”.

Among other functions, ZAQA is responsible for “**determining national standards for any occupation**”, through various sector specific National Occupational Standards Development Teams (NOSDTs) of experts composed of representation from appropriate authorities, government departments, industry, academia, regulators, consumer associations and non-governmental organizations, etc.

This National Occupational Standard (NOS) has been developed by the Energy National Occupational Standards Development Team in accordance with the procedures and guidelines of ZAQA. All users should ensure that they have the latest edition of this publication as National Occupational Standards are revised from time to time.

This NOS shall be used by, among others, industry, employers, quality assurance bodies, awarding and professional bodies and education and training institutions, as a benchmark to identify training needs, develop job profiles/descriptions, develop curricula and learning programmes, in various sectors where the occupation exists. In the Energy sector, demonstration of competence against this NOS may be required in order to run a business or practice a craft or profession.

JUSTIFICATION

Energy Auditors undertake energy efficiency assessments of buildings and industrial facilities. Their audits cover building systems, occupancy, operations, maintenance and code compliance for the purpose of improving energy efficiency with cost benefit analysis and an action plan to reduce consumption.

This National Occupational Standard highlights core knowledge, skills, competences and personal attributes that an Energy Auditor must possess to be successful in their jobs.

ACRONYMS AND ABBREVIATIONS

CS	Core Skill
EA	Energy Auditor
NOS	National Occupational Standard
NOSDT	National Occupational Standards Development Team
OK	Organizational Knowledge
PC	Performance Criteria
PS	Professional Skill
RK	Regulatory Knowledge
RPL	Recognition of Prior Learning
TK	Technical Knowledge
ZAQA	Zambia Qualifications Authority
ZQF	Zambia Qualifications Framework

GLOSSARY OF TERMS

For the purposes of this NOS, the following terms and definitions shall apply:

Core Skills/Generic Skills: are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the NOS, these include communication related skills that are applicable to most job roles.

Function: is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of NOS.

Job Title: defines a unique set of functions that together form a unique employment opportunity in an organisation.

Knowledge and Understanding: are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.

National Occupational Standards (NOS): are statements of the standards of performance individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding. They are precise descriptions of what an individual is expected to be able to do in his/her work role.

National Occupational Standards (NOS) Code: is a unique reference code that identifies a NOS.

National Occupational Standards Development Team (NOSDT): means an established group of national stakeholders/experts responsible for the development of National Occupational Standards within a specific economic sector or occupation.

Occupation: is a set of job roles, which perform similar/related set of functions in an industry.

Organisational Context: includes the way the organisation is structured and how it operates, including the extent of operative knowledge that managers have in their relevant areas of responsibility.

Performance Criteria: are statements that together specify the standard of performance required when carrying out a task.

Scope: is the set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on the quality of performance required.

Sector: is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.

Sub Sector: is derived from a further breakdown based on the characteristics and interests of its components.

Technical Knowledge: is the specific knowledge needed to accomplish specific designated responsibilities.

Unit Title: gives a clear overall statement about what the incumbent should be able to do.

1. OVERVIEW

This is an introductory section providing a brief summary and specific information or commentary about the content of the NOS and the targeted sector and occupation to help the user judge whether it is relevant to them.

NOS Code	NOS.EA.01
Occupation	Energy Auditing
Job Title	Energy Auditor
Job Description	Energy Auditors undertake energy efficiency assessments of buildings and industrial facilities. Their audits cover building systems, occupancy, operations, maintenance and code compliance for the purpose of improving energy efficiency with cost benefit analysis and an action plan to reduce consumption.
Job Purpose	The Job holder collects and analyses energy data in order to recommend ways to improve energy efficiency.
ZQF Level	Level 7
Sector	Energy
Sub sector	Energy Audit, Energy Management and Energy Efficiency.
Other Economic Sector(s) in which the Occupation is Practiced	Mining, Manufacturing and processing, Petroleum, Transport, Telecommunication, Security, Electrical system, Academia, R&D, regulatory and standards agencies
Other Similar Jobs that can be performed by an Energy Auditor	Energy Inspector, Energy Trainer, Energy Monitoring and Evaluation, Energy Consultant.
Minimum Educational Job Entry Qualification(s)	Bachelor's Degree in Engineering or its equivalent
Practicing License Requirements (if any)	Membership with Engineering Institution of Zambia (EIZ) and Practicing license from Engineers Registration Board (EngRB)
Training/RPL	Prior knowledge in Energy related programs recognized by TEVETA with minimum 2 years field experience. Aware of Industry Standards, rules, regulations and their applications. Use of ITCs (Hardware and Software necessary for the job) Quality enhancement methods.
Minimum Job Entry Age	23 year
Prior Experience	Minimum of 2 year internship or apprenticeship
Performance Criteria	As described in the Units under Section 4

2. SCOPE

This National Occupational Standard specifies the fundamental knowledge and understanding, skills and competences that an Energy Auditor must possess to be successful in his/her job role. It is applicable to Energy Auditors working in public or private organisations or self-employed.

3. PERSONAL ATTRIBUTES (VALUES, ETHICS AND ATTITUDES)

This job requires an individual to possess:

- Creativity
- Problem solving skills
- Analytical skills
- Mathematics skills
- Integrity and respect for confidentiality
- Interpersonal skills
- Commercial Awareness
- Attention to details
- Ability to communicate effectively and clearly
- Self-motivated and team worker
- Ability to plan and prioritize,
- Quality consciousness
- Occupational health and safety oriented

4. UNITS AND ELEMENTS

This National Occupational Standard is divided into Six (06) Units representing the tasks that a job holder should undertake in his/her day to day work. Each unit is further broken down into elements depicting the number of activities to be carried out for the successful execution of a particular task.

UNIT 1 [This unit is about health, safety and environment].

Unit No.	01
Unit Title	Safety, health and environmental management
Description	This unit is about maintaining safety, health and environmental protection for the individual and the plant
Scope	This unit covers the following: <ul style="list-style-type: none"> • Health & safety regulations • Environmental protection.
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria (PC)
Health & safety regulations	To be competent, the individual must be able to: PC1.Read, interpret and implement national and organizational safety and health policies and regulations. PC 2. Assess risks and possible safety hazards of all aspects of operations
Environmental protection.	To be competent, the individual must be able to: PC3.Read, interpret and implement the environmental polies for the organisation PC4.Read, interpret and implement environmental standard operating procedures and policies of the organisation PC5. Read, interpret and implement national and global environmental regulations.
Knowledge and Understanding (K)	
A. Organisation-al Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: OK1. Company Quality, health and safety policies OK2.Company environmental policies OK3.Company regulations and global best practices
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of: TK1. Safety and health risk assessment TK2. Environmental Risk assessment TK3.Toolbox talk
C. Regulatory context (Knowledge of Rules and Regulations)	The individual on the job must demonstrate knowledge and understanding of : RK1. Government regulatory agency requirements for health & safety (e.g. Factories act, Mines and Minerals Development Act, Civil Aviation Act, Radiation Protection Act, Petroleum Act, Explosives Act, Engineering Institution of Zambian Act, Environmental Management Act)
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	The individual on the job must be able to: CS1.write in English and be able to give simple concise instructions.

	<p>Reading Skills</p>
	<p>The individual on the job must be able to: CS2. Read and interpret internal/external documents. CS3. Read and understand manuals, health and safety instructions, memos, other company documents. CS4. Ability to read from different sources- books, screens in machines and signage. CS5. Understand the various colour codes, nomenclature and acronyms related to the profession.</p>
	<p>Oral Communication (Listening and Speaking skills)</p>
	<p>The individual on the job must be able to : CS6. Express statements or information clearly so that others can hear and understand. CS7. Participate in and understand the main points of simple discussions. CS8. Respond appropriately to any queries.</p>
<p>B. Professional Skills</p>	<p>Decision Making</p>
	<p>The individual on the job must be able to: PS1. Follow organization rule-based decision-making process. PS2. Take decision with systematic course of actions and/or response.</p>
	<p>Plan and Organise</p>
	<p>The individual on the job must be able to: PS3. Plan and organise work to meet deadlines. PS4. Work constructively and collaboratively with others.</p>
	<p>Customer Centricity</p>
	<p>The individual on the job must be able to: PS5. Follow code of conduct. PS6. Manage relationships with customers with intent on satisfying its requirements for service delivery. .</p>
	<p>Problem Solving and Decision Making</p>
	<p>The individual on the job must be able to: PS7 Recognize problems and search for solutions. PS8. Choose best methods to complete assigned tasks. PS9. Approach relevant authority when required. PS10. Judiciously use common sense in day to day activities</p>
	<p>Analytical Thinking</p>
	<p>The individual on the job must be able to: PS11. Apply domain knowledge, observations and data to select course of action to perform tasks</p>
	<p>Critical Thinking</p>
	<p>The individual on the job must be able to: PS12. Critically evaluate information obtained from customers, supervisor and co-workers to perform day to day activities. PS13. Ask relevant questions for better understanding.</p>

UNIT 2 [This unit is about energy audits for energy users].

Unit No.	02
Unit Title	Energy audits for energy users
Description	This unit is about energy audits for energy users
Scope	This unit covers the following: <ul style="list-style-type: none"> • Understanding the role of energy audit • General approach to conducting the energy audit • Link between energy audit and energy management • Difference between preliminary and detailed audits
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria (PC)
Role of Energy audit	To be competent, the individual must be able to: PC1.demonstrate knowledge on procedures for energy accounting PC2. Review technical efficiency of the power system. PC3: Determine techniques for energy consumption and demand. PC4: Establish norms of checking consumptions of various categories and consumers and overall energy balancing cycles.
Conducting Energy audit.	To be competent, the individual must be able to: PC5. Follow a system step by step process to successfully deliver the audit. PC6.Work with the operators of the facility being audited in order to maximize the benefits of the audit PC7.Establish the baseline energy use PC8. Evaluate energy measures in terms of energy and cost effectiveness. PC9: Produce a timely and comprehensive energy audit report. PC10. Identify appropriate energy audit methods. PC11. Identify appropriate energy audit tools and software applications for ease of data analysis. PC12. Identify the client's organogram and sources of information
Energy audit and energy management	To be competent, the individual must be able to: PC12. Review performance of equipment, meters, electrical system, technical and non-technical loss. PC13.Introduce checks and balances in the system for reducing leakages and losses in the system. PC14. Achieve technical performance. PC15. Collect, analyse and interpret energy consumption data.
Preliminary and detailed energy audits	To be competent, the individual must be able to: PC16. Establish energy consumption. PC17. Identify most likely and easiest areas for attention. PC18. Identify immediate improvements/savings. PC19. Set a reference point. PC20. Identify areas for more detailed study/measurement PC21. Collect relevant data for the audit. PC22. Interpret and analyse the collected data for the audit.

	<p>PC23. Undertake cost benefit analysis. PC24. Generate technical reports.</p>
Knowledge and Understanding (K)	
A. Organisation -al Context (Knowledge of the company/ organisation and its processes)	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>OK1. Company Standard operating procedures and policies OK2. Company regulations and global best practices</p>
B. Technical Knowledge	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>TK1. Preliminary and detailed energy audits TK2. The role of energy audit TK3. The link between energy audit and energy management TK4. Energy audit tools</p>
C. Regulatory context (Knowledge of Rules and Regulations)	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>RK1. Government regulatory agency requirements for energy audit. RK. International best practices on energy audit</p>
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	<p>The individual on the job must be able to:</p> <p>CS1. write in English and be able to give simple concise instructions. CS2. Generate technical reports in standard acceptable formats.</p>
	Reading Skills
	<p>The individual on the job must be able to:</p> <p>CS3. Read and interpret internal/external documents. CS4. Read and understand equipment manuals and other company documents. CS5. Ability to read from different sources- books, screens in machines and signage. CS6. Understand the various colour codes, nomenclature and acronyms related to the profession.</p>
B. Professional Skills	Oral Communication (Listening and Speaking skills)
	<p>The individual on the job must be able to:</p> <p>CS7. Express statements or information clearly so that others can hear and understand. CS8. Participate in and understand the main points of simple discussions. CS9. Respond appropriately to any queries.</p>
	Decision Making
	<p>The individual on the job must be able to:</p> <p>PS1. Follow organization rule-based decision-making process.</p>

	PS2. Take decision with systematic course of actions and/or response.
	Plan and Organise
	The individual on the job must be able to: PS3. Plan and organise work to meet deadlines. PS4. Work constructively and collaboratively with others.
	Customer Centricity
	The individual on the job must be able to: PS5. Follow code of conduct. PS6. Manage relationships with customers with intent on satisfying its requirements for service delivery. .
	Problem Solving and Decision Making
	The individual on the job must be able to: PS7 Recognize problems and search for solutions. PS8. Choose best methods to complete assigned tasks. PS9. Approach relevant authority when required. PS10. Judiciously use common sense in day-to-day activities
	Analytical Thinking
	The individual on the job must be able to: PS11. Apply domain knowledge, observations and data to select course of action to perform tasks
	Critical Thinking
The individual on the job must be able to: PS12. Critically evaluate information obtained from customers, supervisor and co-workers to perform day to day activities. PS13. Ask relevant questions for better understanding.	

UNIT 3 [This unit is about energy fundamentals].

Unit No.	03
Unit Title	Energy Fundamentals
Description	This unit is about energy fundamentals
Scope	This unit covers the following: <ul style="list-style-type: none"> • Energy Units • Energy Calculations.
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria (PC)
Energy Units	To be competent, the individual must be able to: PC1. Define various energy units and conversion factors. PC2. Appropriate application of SI units and empirical units
Energy Calculations	To be competent, the individual must be able to: PC3. Apply appropriate conversion factors to change between units PC4. Compute load factor and loss load factor PC5. Determine various energy losses. PC6. Know the energy supply and demand PC7. Know the cost of energy PC8. Know the efficiency of energy meters.
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: OK1. Company Standard operating procedures and policies OK2. Company regulations and global best practices
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of: TK1. Preliminary and detailed energy audits TK2. The role of energy audit TK3. The link between energy audit and energy management TK4. Energy audit tools
C. Regulatory context (Knowledge of Rules and Regulations)	The individual on the job must demonstrate knowledge and understanding of: RK1. Government regulatory agency requirements for energy audit. RK. International best practices on energy audit
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills The individual on the job must be able to: CS1. write in English and be able to give simple concise instructions. CS2. Generate technical reports in standard acceptable formats.

	<p>Reading Skills</p> <p>The individual on the job must be able to: CS3. Read and interpret internal/external documents. CS4. Read and understand equipment manuals and other company documents. CS5. Ability to read from different sources- books, screens in machines and signage. CS6. Understand the various colour codes, nomenclature and acronyms related to the profession.</p> <p>Oral Communication (Listening and Speaking skills)</p> <p>The individual on the job must be able to: CS7. Express statements or information clearly so that others can hear and understand. CS8. Participate in and understand the main points of simple discussions. CS9. Respond appropriately to any queries.</p>
<p>B. Professional Skills</p>	<p>Decision Making</p> <p>The individual on the job must be able to: PS1. Follow organization rule-based decision-making process. PS2. Take decision with systematic course of actions and/or response.</p> <p>Plan and Organise</p> <p>The individual on the job must be able to: PS3. Plan and organise work to meet deadlines. PS4. Work constructively and collaboratively with others.</p> <p>Customer Centricity</p> <p>The individual on the job must be able to: PS5. Follow code of conduct. PS6. Manage relationships with customers with intent on satisfying its requirements for service delivery. .</p> <p>Problem Solving and Decision Making</p> <p>The individual on the job must be able to: PS7. Recognize problems and search for solutions. PS8. Choose best methods to complete assigned tasks. PS9. Approach relevant authority when required. PS10. Judiciously use common sense in day-to-day activities</p> <p>Analytical Thinking</p> <p>The individual on the job must be able to: PS11. Apply domain knowledge, observations and data to select course of action to perform tasks</p> <p>Critical Thinking</p> <p>The individual on the job must be able to: PS12. Critically evaluate information obtained from customers, supervisor and co-workers to perform day to day activities. PS13. Ask relevant questions for better understanding.</p>

UNIT 4 [This unit is about energy audit process].

Unit No.	04
Unit Title	Energy Audit Process
Description	This unit is about energy audit process
Scope	<p>This unit covers the following:</p> <ul style="list-style-type: none"> • Condition survey • Audit mandate • Audit scope • Analysis of energy consumption and costs • Comparison of energy performance • Profiles of energy use patterns • Inventory of energy use • Identification of Energy Management Opportunities (EMOs) • Assessment of the benefits • Reporting for action
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria (PC)
Condition survey	<p>To be competent, the individual must be able to:</p> <p>PC1. Develop the tool for collecting energy audit information</p> <p>PC2. Conduct an energy survey in order to determine the consumption</p> <p>PC3. Assess the general state of repair</p> <p>PC4. Ensure good housekeeping during the survey</p> <p>PC5. Identify operational practices that have a bearing on energy efficiency</p> <p>PC6. flag situations that warrant further assessment as the audit progresses</p> <p>PC7. Compare the collected data within and between industry</p>
Audit mandate	<p>To be competent, the individual must be able to:</p> <p>PC8. Obtain commitment from management and agree on the expectations and outcomes of the audit</p> <p>PC9. Define and or agree on the times lines for the audit</p>
Audit scope	<p>To be competent, the individual must be able to:</p> <p>PC10. Define the energy-consuming system to be audited</p> <p>PC12. Check the capacity and efficiency of equipment;</p> <p>PC13. Examine the need for automatic controls;</p> <p>PC14. Determine the adequacy of maintenance;</p> <p>PC15. Examine the need for improved instrumentation;</p> <p>PC16. Review new projects with respect to energy use;</p> <p>PC17. Introduce life-cycle costing;</p> <p>PC18. Develop energy use indices to compare performance;</p> <p>PC19. Examine the need for energy saving incentives.</p>

<p>Analysis of energy consumption and costs</p>	<p>To be competent, the individual must be able to: PC20. Establish energy production and consumption in the organization. PC21. Collect, organize, summarize and analyse historical energy billings and the tariffs that apply to them PC22. Estimate the scope of the energy savings. PC23. Identify the most likely and easiest areas for attention. PC24. Identify areas for detailed study/measurements.</p>
<p>Comparison of energy performance</p>	<p>To be competent, the individual must be able to: PC25. Determine energy use indices and compare them internally from one period to another, PC26. Determine energy use indices and compare them from one facility to a similar one within the organization, PC27. Determine energy use indices and compare them from one system to a similar one, or externally to best practices available within the industry</p>
<p>Profiles of energy use patterns</p>	<p>To be competent, the individual must be able to: PC28. Determine the time relationships of energy use, such as the electricity demand profile PC29. Determine unusual occurrences in the load PC30. Determine load management and demand side management</p>
<p>Inventory of energy use</p>	<p>To be competent, the individual must be able to: PC31. Prepare a list of all energy consuming loads in the audit area PC32. measure the consumption and demand characteristics of energy consuming loads</p>
<p>Identification of Energy Management Opportunities (EMOs)</p>	<p>To be competent, the individual must be able to: PC33. Include operational and technological measures to reduce energy waste. PC34. Evaluate energy measures in terms of energy and cost savings and cost effectiveness. PC35. Recommend cost effective and efficient load alternatives PC36. Recommend energy saving behaviours and practices</p>
<p>Assessment of the benefits</p>	<p>To be competent, the individual must be able to: PC37. Measure potential energy and cost savings, along with any co-benefits PC38. Analyse the techniques for measuring energy received and energy billed PC39. Assess the diversity in the system. PC40. Determine optimum utilization of equipment and services PC41. Detail, category-wise the consumption of loads and make a proper forecast of the demand</p>

Reporting for action	<p>To be competent, the individual must be able to:</p> <p>PC42. Report the audit findings and communicate them as needed for successful implementation</p> <p>PC43. Recommend, especially no/low-cost improvements/savings.</p> <p>PC44. Formulate detailed action plans/ strategies in consultation with plant management for implementation of the identified energy saving measures.</p>
Knowledge and Understanding (K)	
A. Organisation-al Context (Knowledge of the company/ organisation and its processes)	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>OK1. Company Standard operating procedures and policies</p> <p>OK2. Company regulations and global best practices</p>
B. Technical Knowledge	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>TK1. Preliminary and detailed energy audits</p> <p>TK2. The role of energy audit</p> <p>TK3. The link between energy audit and energy management</p> <p>TK4. Energy audit tools</p>
C. Regulatory context (Knowledge of Rules and Regulations)	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>RK1. Government regulatory agency requirements for energy audit.</p> <p>RK2. International best practices on energy audit</p>
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	<p>The individual on the job must be able to:</p> <p>CS1. Write in English and be able to give simple concise instructions.</p> <p>CS2. Generate technical reports in standard acceptable formats.</p>
	Reading Skills
	<p>The individual on the job must be able to:</p> <p>CS3. Read and interpret internal/external documents.</p> <p>CS4. Read and understand equipment manuals and other company documents.</p> <p>CS5. Ability to read from different sources- books, screens in machines and signage.</p> <p>CS6. Understand the various colour codes, nomenclature and acronyms related to the profession.</p>
Oral Communication (Listening and Speaking skills)	
<p>The individual on the job must be able to:</p> <p>CS7. Express statements or information clearly so that others can hear and understand.</p>	

	<p>CS8. Participate in and understand the main points of simple discussions. CS9. Respond appropriately to any queries.</p>
<p>B. Professional Skills</p>	<p>Decision Making</p>
	<p>The individual on the job must be able to: PS1. Follow organization rule-based decision-making process. PS2. Take decision with systematic course of actions and/or response.</p>
	<p>Plan and Organise</p>
	<p>The individual on the job must be able to: PS3. Plan and organise work to meet deadlines. PS4. Work constructively and collaboratively with others.</p>
	<p>Customer Centricity</p>
	<p>The individual on the job must be able to: PS5. Follow code of conduct. PS6. Manage relationships with customers with intent on satisfying its requirements for service delivery. .</p>
	<p>Problem Solving and Decision Making</p>
	<p>The individual on the job must be able to: PS7 Recognize problems and search for solutions. PS8. Choose best methods to complete assigned tasks. PS9. Approach relevant authority when required. PS10. Judiciously use common sense in day-to-day activities</p>
	<p>Analytical Thinking</p>
	<p>The individual on the job must be able to: PS11. Apply domain knowledge, observations and data to select course of action to perform tasks</p>
<p>Critical Thinking</p>	
<p>The individual on the job must be able to: PS12. Critically evaluate information obtained from customers, supervisor and co-workers to perform day to day activities. PS13. Ask relevant questions for better understanding.</p>	

UNIT 5 [This unit is about tools for energy audits].

Unit No.	05
Unit Title	Tools for energy audits
Description	This unit is about tools for energy audits
Scope	<p>This unit covers the following:</p> <ul style="list-style-type: none"> • Measurement of Electrical Systems • Temperature measurements • Combustion Systems • Steam Systems • HVAC Systems • Buildings • Compressed Air • Data Loggers • Low Pressure Hot Water and Chilled water
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria (PC)
Measurement of Electrical Systems	<p>To be competent, the individual must be able to:</p> <p>PC1.Use, read and interpret values from a Multimeter PC2.Use, read and interpret values from a voltmeter and Ammeter PC3.Use, read and interpret values from a power meter</p>
Temperature measurements	<p>To be competent, the individual must be able to:</p> <p>PC4.Use, read and interpret values from a Surface pyrometer. PC5.Use, read and interpret values from portable electronic instruments/equipment. PC6.Use, read and interpret values from thermometer. PC7.Use, read and interpret values from thermocouple probe. PC8.Use, read and interpret values from infrared thermometer. PC9.Use, read and interpret values from thermo imaging camera.</p>
Combustion Systems	<p>To be competent, the individual must be able to:</p> <p>PC10.Use, read and interpret values from a Combustion analyser</p>
Steam Systems	<p>To be competent, the individual must be able to:</p> <p>PC11.Use, read and interpret values from an Ultrasonic leak. PC12.Use, read and interpret values from Detectors. PC13.Use, read and interpret values from a Steam trap tester</p>
HVAC Systems	<p>To be competent, the individual must be able to:</p> <p>PC14.Use, read and interpret values from a Manometer. PC15.Use, read and interpret values from a Cyclometer/Sling hydrometer. PC16.Use, read and interpret values from Anemometer</p>

Buildings	To be competent, the individual must be able to: PC17.Use, read and interpret values from a Light meter PC18.Use, read and interpret values from a Measuring tape PC19.Use, read and interpret values from a Thermo imaging camera
Compressed Air	To be competent, the individual must be able to: PC20.Use, read and interpret values from Ultrasonic leak. PC21.Use, read and interpret values from Detectors.
Data Loggers	To be competent, the individual must be able to: PC22.Use, read and interpret values from a 4-20mA logger PC23.Use, read and interpret values from a 0-10V logger PC24.Use, read and interpret values from a Digital logger PC25.Use, read and interpret values from a Vibration Logger PC26.Use, read and interpret values from a Light sensor
Low Pressure Hot Water and Chilled water	To be competent, the individual must be able to: PC27.Use, read and interpret values from Ultrasonic flow meters PC28.Use, read and interpret values from a Laser Doppler PC29.Use, read and interpret values from a Velocity meter PC30.Use, read and interpret values from a Particle Image Velocimetry(PIV)
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: OK1. Company Standard operating procedures and policies OK2.Company regulations and global best practices
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of: TK1. Preliminary and detailed energy audits TK2. The role of energy audit TK3. The link between energy audit and energy management TK4. Energy audit tools
C. Regulatory context (Knowledge of Rules and Regulations)	The individual on the job must demonstrate knowledge and understanding of: RK1. Government regulatory agency requirements for energy audit. RK2. International best practices on energy audit
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	The individual on the job must be able to: CS1.write in English and be able to give simple concise instructions.

	CS2. Generate technical reports in standard acceptable formats.
	Reading Skills
	The individual on the job must be able to: CS3. Read and interpret internal/external documents. CS4. Read and understand equipment manuals and other company documents. CS5. Ability to read from different sources- books, screens in machines and signage. CS6. Understand the various colour codes, nomenclature and acronyms related to the profession.
	Oral Communication (Listening and Speaking skills)
	The individual on the job must be able to: CS7. Express statements or information clearly so that others can hear and understand. CS8. Participate in and understand the main points of simple discussions. CS9. Respond appropriately to any queries.
B. Professional Skills	Decision Making
	The individual on the job must be able to: PS1. Follow organization rule-based decision-making process. PS2. Take decision with systematic course of actions and/or response.
	Plan and Organise
	The individual on the job must be able to: PS3. Plan and organise work to meet deadlines. PS4. Work constructively and collaboratively with others.
	Customer Centricity
	The individual on the job must be able to: PS5. Follow code of conduct. PS6. Manage relationships with customers with intent on satisfying its requirements for service delivery. .
	Problem Solving and Decision Making
	The individual on the job must be able to: PS7. Recognize problems and search for solutions. PS8. Choose best methods to complete assigned tasks. PS9. Approach relevant authority when required. PS10. Judiciously use common sense in day-to-day activities
	Analytical Thinking
	The individual on the job must be able to: PS11. Apply domain knowledge, observations and data to select course of action to perform tasks
Critical Thinking	
The individual on the job must be able to: PS12. Critically evaluate information obtained from customers, supervisor and co-workers to perform day to day activities. PS13. Ask relevant questions for better understanding.	

UNIT 6 [This unit is about energy using Technologies for energy audits].

Unit No.	06
Unit Title	Energy using Technologies for energy audits
Description	This unit is about energy using Technologies for energy audits
Scope	This unit covers the following: <ul style="list-style-type: none"> • Software application packages for Energy audit • Simulation and Analysis packages for Energy audit
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria (PC)
Software application packages for energy audit	To be competent, the individual must be able to: PC1. Distinctively identify the most appropriate tool for the intended audit. PC2. Effectively use energy audit software PC3. Correctly Interpret numerical data and simulations
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: OK1. Company Standard operating procedures and policies OK2. Company regulations and global best practices
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of: TK1. Preliminary and detailed energy audits TK2. The role of energy audit TK3. The link between energy audit and energy management TK4. Energy audit tools
C. Regulatory context (Knowledge of Rules and Regulations)	The individual on the job must demonstrate knowledge and understanding of: RK1. Government regulatory agency requirements for energy audit. RK2. International best practices on energy audit
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	The individual on the job must be able to: CS1.write in English and be able to give simple concise instructions. CS2.Generate technical reports in standard acceptable formats.
	Reading Skills
	The individual on the job must be able to: CS3.Read and interpret internal/external documents. CS4. Read and understand equipment manuals and other company documents. CS5. Ability to read from different sources- books, screens in machines and signage.

	<p>CS6. Understand the various colour codes, nomenclature and acronyms related to the profession.</p>
	<p>Oral Communication (Listening and Speaking skills)</p>
	<p>The individual on the job must be able to: CS7. Express statements or information clearly so that others can hear and understand. CS8. Participate in and understand the main points of simple discussions. CS9. Respond appropriately to any queries.</p>
<p>B. Professional Skills</p>	<p>Decision Making</p>
	<p>The individual on the job must be able to: PS1. Follow organization rule-based decision-making process. PS2. Take decision with systematic course of actions and/or response.</p>
	<p>Plan and Organise</p>
	<p>The individual on the job must be able to: PS3. Plan and organise work to meet deadlines. PS4. Work constructively and collaboratively with others.</p>
	<p>Customer Centricity</p>
	<p>The individual on the job must be able to: PS5. Follow code of conduct. PS6. Manage relationships with customers with intent on satisfying its requirements for service delivery. .</p>
	<p>Problem Solving and Decision Making</p>
	<p>The individual on the job must be able to: PS7 Recognize problems and search for solutions. PS8. Choose best methods to complete assigned tasks. PS9. Approach relevant authority when required. PS10. Judiciously use common sense in day-to-day activities</p>
	<p>Analytical Thinking</p>
	<p>The individual on the job must be able to: PS11. Apply domain knowledge, observations and data to select course of action to perform tasks</p>
	<p>Critical Thinking</p>
	<p>The individual on the job must be able to: PS12. Critically evaluate information obtained from customers, supervisor and co-workers to perform day to day activities. PS13. Ask relevant questions for better understanding.</p>

5. EQUIPMENT, TOOLS AND CONSUMABLE MATERIALS

These include, but not limited to; Computer, Printer and relevant Software programs, Personal protective equipment (PPE), Energy Measuring Instruments

6. DILEMMAS/CHALLENGES AND COMPLEXITIES FOR A JOB HOLDER

Dilemmas associated with the job of an Energy auditor include long working hours, exposure to chemical, physical and biological hazards, time pressure to complete tasks, working in extreme weather such as hot and cold conditions, working in noisy, wet and dusty environments, etc.

6.1 Alternative Choices (Solutions) to Dilemmas and Complexities

Solutions to dilemmas include carrying out risk assessment and implementing appropriate control measures, ensuring good time management and planning, participating in workplace safety sensitization and awareness, supporting capacity building through training, managing work stress, adhering to company's safety and standard operating procedures at all times, paying attention to detail, consulting extensively within and outside one's department/team on safety and other issues.

7. WORKING CONDITIONS/ENVIRONMENT

Working conditions include working in cold, hot and wet conditions, working at heights, stand/walk for long hours, working in laboratory environment, working in shifts, areas that are noisy and dusty, areas with limited lighting and ventilation. Working in confined spaces, working in explosives environment.

8. PARTIES INVOLVED/INTERACTING WITH THE JOB HOLDER OR TRAINEE

8.1 Internal/Within the Organization

Parties involved/interacting with the job holder who are internal to the organization include supervisors, subordinates, and other employees (e.g. architects, surveyors, engineers: civil, building, electrical and mechanical), trainers, safety team, etc.

8.2 External/Outside the Organization

Parties involved/interacting with the job holder who are external include customers/clients, government regulators, trainers, suppliers of equipment/tools/consumables, Engineers from other companies, labour unions/occupational health and safety associations, Academia etc.

9. PHYSICAL DEMANDS ON THE BODY

- Physique to sustain strenuous conditions;
- Be able to walk and stand for long periods of time;
- Bend, stretch, twist, or reach out;
- Be able to lift relatively heavy materials, tools and equipment;
- Be able to use fingers, hands and feet with ease to complete the assigned task (dexterity).

ANNEX A

Criteria for Assessments based on this NOS

A.1 Guidelines for Assessment

A.1.1 Criteria for assessment for curricula and learning programmes based on this NOS will be created by curricula and programmes developers. Each Performance Criteria (PC) will be assigned marks proportional to its importance in the NOS. Curricula and programmes developers will also lay down proportion of marks for theory and practical skills for each performance criteria, giving more weight to practical skills.

There shall be allocated the 'Total Mark', which will be the sum of all marks in each Unit, distributed across the number of PCs in that particular Unit. The 'out of' mark will be the mark allocated to each PC, which will be shared between theory and skills practical assessments.

A.1.2 Awarding/assessment bodies or institutions and other users of the NOS will create unique question papers for the theory part and evaluations for skill practical part for their respective candidates.

ANNEX B NOS Version Control

This Annex gives details necessary for the tracking of the NOS versions based on the number of revisions.

NOS Code	NOS.EA.01		
ZQF Level	Level 7	Version Number	01
Sector	Energy	Date of Approval	September 2021
Sub Sector	Energy Audit, Energy Management and Energy Efficiency.	Date of Last Review	N/A
Occupation	Energy Auditor	Date of Next Review	September 2026

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