THE NATIONAL COUNCIL FOR TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING

OCCUPATIONAL STANDARDS

OCCUPATION: RENEWABLE ENERGY ENGINEER (SOLAR)

LEVEL: NTA LEVEL 8

FEBRUARY 2024

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ABBREVIATIONS

BAPV	Building Attached Photovoltaic
BIPV	Building Integrated Photovoltaic
BMS	Battery Management System
BOS	Balance of System-photovoltaic
CBET	Competency Based Education and Training
CVT	Constant Voltage Packaging
EMS	Energy Management System
IEA	International Energy Agency
IRENA	International Renewable Energy Agency
NACTVET	National Council for Technical and Vocational Education and Training
NOS	National Occupational Standards
OS	Occupational Standards
PCS	Power Conversion System
PR	Performance Ratio
PVPS	PV Power Station
SC	Storage Capacitor
TET	Technical Education and Training
TVET	Technical and Vocational Education and Training

VSG Virtual Synchronous Generator

GLOSSARY OF TERMS

Circumstantial Knowledge:	Detailed knowledge, which allows the decision-making in regard to different circumstances and cross cutting issues.
Competence:	The ability to use knowledge, understanding, practical, and thinking skills to perform effectively to the workplace standards required in employment.
Competency:	A description of the ability one possesses when able to perform a given occupational task effectively and efficiently.
Competency-based Education:	An instructional programme that derives its content from validated tasks and bases assessment on the learner's performance.
Curriculum:	A description or composite of statements about "what is to be learned" by the trainee/student in a particular instructional programme; a product that states the "intended learning outcomes".
Educational/Training Programme:	The complete curriculum and instruction (what and how) that is designed to prepare a person for employment in a job or other particular performance situation.
Occupation:	A specific position requiring the performance of specific tasks - essentially the same tasks are performed by all employees having the same title.
Occupational Area:	Extensive grouping of related work, such as PV module installation.
Occupational Standards:	Specific requirements of competences for personnel in a particular occupational area, including knowledge and relevant attitudes. They also act as performance tools of assessment of the prescribed outcomes.
Occupational/Job Analysis:	A process used to identify the tasks that are important to employees in any given occupation.
Performance Criteria:	Indicate expected end results or outcomes in the form of evaluative statements.
Skills:	The ability to perform occupational tasks with a high degree of proficiency within a given occupation. Skill is conceived of as a composite of three completely interdependent components: cognitive, affective, and psychomotor.

Standards:	A set of statements, which, if proved true under working conditions, means that an individual is meeting an expected level and type of performance.
Task Analysis:	The process of analyzing each task to determine the steps, circumstantial knowledge, attitudes, performance criteria, tools and materials needed, as well as safety concerns required for the employees performing it.
Task:	A work activity that has a definite beginning and ending, is observable or measurable, consists of two or more definite steps, and leads to products, service, or decisions.
Underpinning Knowledge:	Crucial knowledge that an individual must acquire in order to demonstrate competences that are associated in performing a given task.
Verification Process:	The process of having experts review and confirm the importance of the task (competency) statements identified through occupational analysis. Other questions, such as the degree of task learning difficulty are also frequently asked. This process is also sometimes referred to as validation.
Occupational Competence:	The application of knowledge and skills that consistently meet the standards required by the working conditions.

1.0. INTRODUCTION

Technical Education and Training (TET) is one of the most important education sub-sectors in Tanzania, responsible for developing a skilled workforce to support the country's industrialization economic agenda. Tanzania's *Development Vision 2025* intends to raise the country's economy to a middle-income status, with a high level of human development. This requires a skilled workforce that is aligned with the needs of the public and private sectors of the economy. The National Council for Technical and Vocational Education and Training (NACTVET) has begun the job of drafting Occupational Standards (OS) that will eventually be adopted as National Occupational Standards (NOS) for use in the delivery of TET that meets the needs of the labour market and the country's economic agenda.

Occupational Standards (OS) are performance criteria that are matched with labour market demands. Each of them describes the functions, performance standards, and understanding or knowledge underpinning a given occupation. They combine skills, knowledge, and attitudes to describe best practice. They are useful tools for establishing job roles, personnel recruitment, supervision, and appraisal, as well as TET Standards. They are also helpful for benchmarking and harmonizing job qualifications on a national and international level. Standards, in general, provide a solid framework for high-quality TET that is labour market-relevant, current, and consistent in application across all public and private institutions.

However, it must be noted that Occupational Standards are different from Training /Education Standards. Occupational standards are defined in terms of activities performed by a person in a selected occupation (e.g., an electrical engineer designs electrical circuits, performs troubleshooting in electrical circuits, etc.), and are usually defined by Employers following procedures as agreed upon by all the stakeholders. On the other hand, Training and Education Standards are developed from the activities defined in the occupational standards, and they specify learning objectives to ensure that the necessary skills and knowledge are developed by a person to enable him/her to function at an agreed level in an occupation. Training and Education Standards are used to define curricula in training institutions. It is critical, however, to establish a direct link between the occupational standards and the training standards for both of them to respond collaboratively to the demands of the labour market.

For the purpose of TET delivery, Tanzania has adopted the Competence Based Education and Training (CBET) approach. The CBET approach focuses on providing learners with the skills and knowledge required to meet the occupational standards. Occupational standards are thus the starting point for developing competency-based training (CBET) programmes. Therefore, it is quite pertinent for TET institutions to use the relevant occupational standards as a benchmark for formulating their curricula.

Occupational Standards are developed based on a given occupation's current and future demands. As a result, they serve as a means of bridging the gap between the worlds of employment and technical education and training.

The document explains how the occupational standards were developed, as well as the scope, the occupational profile in the form of DACUM charts, and the Occupational Standards.

2.0. OCCUPATIONAL STANDARD DEVELOPMENT PROCESS

The process of developing these Occupational Standards involved both local and international expertise. The process began with an examination of major documents that guide Tanzanian skills development including the *10-year National Skills Development Strategy (2016-2026).* NACTVET labour market reports were also used in the literature review to determine the skills demand in the Tanzanian labour market as a whole.

After the literature review, a team of experts in consultation with practitioners developed draft occupational standards. The draft document was used to develop an occupational profile for each occupation (DACUM Chart), which is attached as an **Appendix** to every Occupational Standard.

The occupational standards were validated during the stakeholders' forum held on 22nd and 23rd February 2024 at Morogoro. The information from the stakeholders' forum provides insight from the workplaces, professional bodies, regulatory bodies and sector ministries regarding trends and changes in the profession, including how well graduates are prepared for working in the occupation.

3.0. THE SCOPE AND OVERVIEW OF THE OCCUPATION STANDARDS FOR RENEWABLE ENERGY ENGINEERING ENGINEERS (SOLAR)

The standards cover a broad range of duties and tasks that can be performed by a Renewable Energy engineer (Solar). However, the occupational standards are not meant to replace individual job descriptions. Instead, they are to be used for guidance in defining skill levels and knowledge for the

technician in specific settings or positions. The Renewable Energy engineer (Solar) may perform tasks in a number of key areas of the Occupational Standards, but not necessarily in all areas. For example, in large operations, other individuals may be employed or designated to perform specific tasks.

The Renewable Energy engineer (Solar) refers to the personnel engaged in the design, installation, debugging and maintenance of solar photovoltaic energy system. Generally, the Renewable Energy engineer (Solar)performs the following responsibilities:

a) Designing of solar photovoltaic energy system

b) Installation and debugging of solar photovoltaic energy system with tools

c) Inspection and resolution of faults of solar photovoltaic energy system

d) Diagnosis on components of solar photovoltaic energy system with professional computer softwares

e) Interpretation and analysis of results and data

f) Provision of technical advice and answering of customers' questions

g) Procurement of solar photovoltaic energy system and selection of best materials for utilization

h) Management of PV power stations

i) Operation and maintenance of PV power stations

j) Analysis of economized operation of PV power stations

k) Writing of reports and documents

l) Relevant researches

m) Guidance and training

n) Technical exchange

o) Supervision on subordinates

The Occupational Standards have been clustered into NTA qualification levels, i.e. NTA 7 and 8.

4.0. VALIDITY PERIOD

Due to the rapid development of technology, the validity period of occupational standards is 3-5 years. The review will proceed in the same manner as the one before it, with new occupational standards being developed based on current trends of the labour market.

5.0. OCCUPATIONAL STANDARDS

5.1 OCCUPATIONAL STANDARDS FOR RENEWABLE ENERGY ENGINEER (SOLAR) – NTA LEVEL 8

<table>
<tr><td>OCCUPATION</td><td>RENEWABLE ENERGY ENGINEER (SOLAR)</td><td>OCCUPATION CODE</td><td></td></tr>
<tr><td>DUTY TITLE</td><td>DESIGN THE SCHEME FOR THE CONSTRUCTION OF THE ENERGY STORAGE SYSTEMS</td><td>DUTY NO.</td><td>801</td></tr>
<tr><td>TASK TITLE</td><td>ANALYZE THE NEEDS FOR THE CONSTRUCTION OF ENERGY STORAGE SYSTEMS</td><td>TASK NO.</td><td>8011</td></tr>
<tr><td>PERFORMANCE CRITERIA</td><td colspan="3">The person performing this task must be able to analyze the needs for the construction of energy storage systems in accordance with the project plan and the relevant local laws and regulations and industry development status.</td></tr>
<tr><td>RANGE STATEMENT</td><td colspan="3">The task can be performed in the office under the supervision of senior engineers or project managers.
The tools and equipment to be used include:
1. Computer set with computer-aided design software;
2. Printers and scanners;
3. Local geographic map and urban planning data documents;
4. Multimedia conference tools.
5. Safety gear</td></tr>
<tr><td colspan="4">EVIDENCE REQUIREMENT</td></tr>
<tr><td colspan="2">PRACTICAL PERFORMANCE</td><td colspan="2">UNDERPINNING KNOWLEDGE</td></tr>
<tr><td colspan="2">The person performing this task must be able to do the following:
1. Conduct research on the project needs of the owner: project construction scale, investment scale, construction period, technical requirements, etc.;
2. Understand relevant national and local government regulations, rules and policies;
3. Conduct research on the power structure of the local power grid and analyze the characteristics of power load;
4. Select the overall technical scheme for energy storage power stations;</td><td colspan="2">Detailed knowledge about:
1.0 Methods
The person performing this task must be able to explain how to:
1.1 Organize a seminar on the needs of owners;
1.2 Organize on-site exploration and measurement;
1.3 Organize the selection and evaluation of technical schemes for energy storage power stations.

2.0 Principle
The person performing this task must be able to</td></tr>
</table>

5. Determine product execution standards and process flow; 6. Write a demand analysis report for energy storage power station projects. 7. Observe health, occupational and environmental safety rules and regulations.	explain the following principles: 2.1 Design specifications for energy storage power stations; 2.2 Technical requirements for evaluating the characteristics of energy storage systemsconnected to distribution networks; 2.3 Specifications for construction, operation and maintenance acceptance of PV power stations. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Power load model and indicator calculation; 3.2 The method of connecting PV power stations to the power grid; 3.3 Format of documents used in electro technology series of standards. **4.0 Essential Skills** 4.1 Teamwork skills; 4.2 Report writing skills; 4.3 Communication skills; 4.4 Computer application skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The needs for the construction of energy storage power station are analyzed in accordance with the project plan and the relevant local laws and regulations and industry development status.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	DESIGN THE SCHEME FOR THE CONSTRUCTION OF THE ENERGY STORAGE POWER STATIONS	**DUTY NO.**	801
TASK TITLE	ANALYZE THE CONSISTENCY OF SOLAR ENERGY RESOURCES	**TASK NO.**	8012
PERFORMANCE CRITERIA	The person performing this task must be able to analyze the consistency of the solar energy resources according to the geographical conditions and basic climatic conditions of the area where the station is to be constructed.,		
RANGE STATEMENT:	The task can be performed in the office under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Computers and computer-aided design software; 2. Printers and scanners; 3. Solar energy resource measuring instruments; 4. GPS instrument. 5. Safety gear		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select a reference meteorological station; 2. Collect meteorological information from the reference meteorological station; 3. Analyze the geographical and climatic consistency between the reference meteorological station and the station site; 4. Analyze the changes in annual radiation levels over a long period of time and the inter-annual changes in monthly radiation levels; 5. Analyze the annual solar radiation data of various PV array packaging modes; 6. Write a report on the analysis of solar energy resources. 7. Observe health, occupational and environmental safety rules and	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Conduct on-site surveys and research on meteorological and geographic information; 1.2 Obtain historical meteorological information through meteorological stations; 1.3 Collect and analyze solar radiation data. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Specification for measurement of solar energy resources; 2.2 Specification for the assessment on solar energy resources of solar-thermal power stations; 2.3 Technical regulations for the assessment on

regulations.	solar energy resources in solar power generation engineering. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 PV array packaging system; 3.2 Assessment methods of solar energy resources; 3.3 Direct radiation measurement method for solar trackers. **4.0 Essential Skills** 4.1 Data statistics skills; 4.2 Communication skills; 4.3 Report writing skills; 4.4 Computer application skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The consistency of solar energy resources are analyzed according to the geographical conditions and basic climatic conditions of the area where the station is to be constructed
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	DESIGN THE SCHEME FOR THE CONSTRUCTION OF THE ENERGY STORAGE POWER STATIONS	**DUTY NO.**	801
TASK TITLE	SELECT THE TYPE AND CAPACITY OF THE ENERGY STORAGE SYSTEMS	**TASK NO.**	8013
PERFORMANCE CRITERIA	The person performing this task must be able to select the type and capacity of the energy storage power station in accordance with the specific demand analysis.		
RANGE STATEMENT:	The task can be performed in the office under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Computer sets with computer-aided design software; 2. Printers and scanners; 3. A manual for equipment selection; 4. A report on demand analysis of energy storage power stations; 5. A report on the analysis of solar energy resources. 6. Safety gear		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Determine the type of energy storage power station; 2. Determine the configuration of photovoltaic power generation capacity and energy storage capacity; 3. Select the type of solar PV arrays; 4. Design a spotlight and packaging system; 5. Design an energy storage system; 6. Select the main photovoltaic energy storage equipment; 7. Determine the infrastructure and installation methods; 8. Write a report on the capacity configuration of energy storage power	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Select the parameters of the PV module; 1.2 Select energy storage batteries; 1.3 Select and evaluate the spotlight packaging function; 1.4 Calculate the photovoltaic power generation and energy storage capacity. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Design principles of focusing and packaging systems;

stations. 9. Observe health, occupational and environmental safety rules and regulations.	2.2 Design specifications for PV power stations; 2.3 Layout specifications for PV arrays; 2.4 Technical requirements for electrochemical energy storage systems in power systems. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 PV generation system theory; 3.2 Energy storage power station system theory. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Safety management skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The type and capacity of the energy storage power station are selected in accordance with the specific demand analysis.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	DESIGN THE SCHEME FOR THE CONSTRUCTION OF THE ENERGY STORAGE SYSTEMS	**DUTY NO.**	801
TASK TITLE	SELECT THE SITE AND ARRANGE THE STATION AREA	**TASK NO.**	8014
PERFORMANCE CRITERIA	The person performing this task must be able to select the site and arrange the station area in accordance with the client's needs.		
RANGE STATEMENT:	The task can be performed in the office under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Computer set with a computer-aided design software; 2. Printers and scanners; 3. Information on geographical disasters, urban planning, etc.; 4. A report on the configuration work of an energy storage power station. 5. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Analyze geographical and natural environmental conditions; 2. Analyze the transportation conditions inside and outside the power station area; 3. Determine the site and site size; 4. Develop flood control and disaster resistance plans and measures; 5. Draw a general layout plan of the energy storage power station. 6. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Conduct on-site surveys and research on geographical and natural environment; 1.2 Conduct research on transportation resources at pre-selected station sites; 1.3 Organize meetings to study and review flood control and disaster resistance measures. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Design standard for electrochemical energy storage power stations; 2.2 Safety procedures of electrochemical energy storage power station;

	2.3 Safety code of electric power industry. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Analysis methods of geographical and natural environment; 3.2 Statistics and analysis of transportation resources; 3.3 Methods of drawing the general layout plan. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Safety management skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The site is selected and the arrangement for the station area completed in accordance with the needs of the owner is drawn.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	DESIGN THE SCHEME FOR THE CONSTRUCTION OF THE ENERGY STORAGE SYSTEMS	**DUTY NO.**	801
TASK TITLE	DESIGN THE ELECTRICAL TECHNICAL SCHEME FOR THE ENERGY STORAGE SYSTEMS	**TASK NO.**	8015
PERFORMANCE CRITERIA	The person performing this task must be able to design the electrical technical scheme of the energy storage power station in accordance with the type and capacity of the energy storage systems.		
RANGE STATEMENT	The task can be performed in the office under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Computers and computer-aided design software; 2. Printers and scanners; 3. A report on the configuration work of an energy storage power station; 4. A general layout design drawing of the station area; 5. Equipment selection and user manual. 6. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: Select step-up transformers; 1. Determine the scheme of main electrical connection; 2. Design a station power system scheme; 3. Design a DC electrical system scheme; 4. Design a power distribution system scheme; 5. Design a reactive power compensation scheme; 6. Design an electrical scheme for secondary equipment; 7. Design a scheme for the overvoltage protection, insulation coordination and lightning protection grounding system; 8. Determine the electrical layout plan of	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Organize a review of the selection of major equipment; 1.2 Organize the review of electrical schemes and schematic drawings; 1.3 Merge and review design scheme documents. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Technical code of design for the electric power system; 2.2 Technical rules for connecting micro-grid to

the station; 9. Prepare a cable schedule and laying plan; 10. Prepare an electrical technical scheme for energy storage power stations. 11. Observe health, occupational and environmental safety rules and regulations.	power system; 2.3 Design specification of PV power station. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Basic theory of relay protection automation design; 3.2 Basic theory of electrical equipment operation and maintenance. **4.0 Essential Skills** 4.1 Organization and communication skills; 4.2 Teamwork skills; 4.3 Report writing skills 4.4 Computer application skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The electrical technical scheme for energy storage systems is designed in accordance with the type and capacity of the energy storage power station.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	DESIGN THE SCHEME FOR THE CONSTRUCTION OF THE ENERGY STORAGE POWER SYSTEMS	**DUTY NO.**	801
TASK TITLE	CONDUCT AND PREPARE A FEASIBILITY STUDY REPORT	**TASK NO.**	8016
PERFORMANCE CRITERIA	The person performing this task must be able to conduct and prepare a feasibility study report in accordance with the requirement analysis report.		
RANGE STATEMENT	The task can be performed in the office under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Computer sets with a computer-aided design software; 2. Printers and scanners; 3. A report on demand analysis of energy storage power stations; 4. A report on the capacity configuration of energy storage power stations; 5. A general layout design drawing of the station area; 6. A technical scheme document for electrical design of energy storage systems. 7. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Review the demand analysis report for energy storage power stations; 2. Review the electrical technical scheme report; 3. Prepare an environmental protection plan report; 4. Prepare a project implementation arrangement plan; 5. Prepare an economic benefit analysis report; 6. Prepare a project risk assessment and analysis report; 7. Prepare a comprehensive evaluation report; 8. Prepare a feasibility study report for the	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Organize project report review; 1.2 Coordinate and schedule project resources; 1.3 Review and merge feasibility analysis documents. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Design specification of PV power station; 2.2 Design standard for electrochemical energy storage power stations; 2.3 Environmental assessment standards;

project. 9. Observe health, occupational and environmental safety rules and regulations.	2.4 Calculation criteria for economic benefits. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Economic evaluation methods and parameters for construction project; 3.2 Quality control system. **4.0 Essential Skills** 4.1 Organization and communication skills; 4.2 Teamwork skills; 4.3 Report writing skills 4.4 Computer application skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	A feasibility study report for the project of energy storage systems is prepared in accordance with the requirement analysis report.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	PREPARE A CONSTRUCTION SCHEME FOR NEW ENERGY POWER STATIONS	**DUTY NO.**	802
TASK TITLE	PREPARE A CONSTRUCTION SCHEME FOR THE INFRASTRUCTURE CONSTRUCTION OF NEW ENERGY POWER STATIONS	**TASK NO.**	8021
PERFORMANCE CRITERIA	The person performing this task must be able to prepare a construction scheme for the infrastructure construction of the new energy power station in accordance with the with the client's need and the technical inputs from the designer, architect and supervisor.		
RANGE STATEMENT:	The task can be performed under the supervision of project managers. The tools and equipment to be used include: 1. Computer sets with a computer-aided design software; 2. Engineering quality standard documents; 3. Engineering quality inspection method documents; 4. Standardized construction process and requirement documents; 5. Feasibility plan documents for new energy power stations; 6. Construction drawings and documents for new energy power stations; 7. National and local engineering and construction rules, regulations and policy documents. 8. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Determine the design intent and engineering requirements of the power station; 2. Familiarize with the technical requirements, acceptance standards and relevant regulations for power station engineering construction; 3. Understand relevant national and local government regulations, rules and policies; 4. Preside over the review of construction	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Determine the construction quantity of the project; 1.2 Review construction drawings and plans; 1.3 Coordinate and schedule project resources; 1.4 Merge and review construction scheme documents. **2.0 Principle**

drawings and improve the design content; 5. Assist in the on-site investigation and survey, and improve engineering data; 6. Determine the construction process and standard process requirements; 7. Implement environmental protection and water and soil conservation measures; 8. Prepare a detailed construction scheme; 9. Organize and complete the review and countersigning of construction schemes. 10. Observe health, occupational and environmental safety rules and regulations.	The person performing this task must be able to explain the following principles: 2.1 The rationality and operability of the plan; 2.2 Construction period standards and dynamic management control principles; 2.3 Project acceptance standard requirements; 2.4 The principle of balancing comprehensive costs and benefits. **3.0 Theories** 3.1 Civil engineering construction safety and quality control theory; 3.2 Civil engineering construction project management theory; 3.3 Human resources management theory; 3.4 Civil engineering standard process flow. **4.0 Essential Skills** 4.1 Teamwork skills; 4.2 Oral and written communication skills; 4.3 Communication skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	A construction scheme for the infrastructure construction of new energy power station is prepared in accordance with the owner's need and the technical inputs from the designer, architect and supervisor.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	PREPARE A CONSTRUCTION SCHEME FOR SOLAR PV POWER STATIONS	**DUTY NO.**	802
TASK TITLE	PREPARE A CONSTRUCTION SCHEME FOR SOLAR PV POWER SUBSYSTEMS	**TASK NO.**	8022
PERFORMANCE CRITERIA	The person performing this task must be able to prepare a construction scheme for the Solar PV power subsystems in accordance with the Solar PV module manufacturer specifications, the electrical engineering requirements of Solar PV power subsystems, the client's goal and the inputs from the designer, and the supervising engineer.		
RANGE STATEMENT:	The task can be performed under the supervision of project managers. The tools and equipment to be used include: 1. Computer sets with a computer-aided design software; 2. Engineering quality standard documents; 3. Engineering quality inspection method documents; 4. Power construction project specifications and requirement documents; 5. Documents for technical requirements of the PV power subsystem project; 6. Construction drawings and documents for PV power subsystems; 7. National and local new energy utilization rules, regulations and policy documents. 8. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Determine the design requirements for PV power subsystems; 2. Master the technical requirements, acceptance standards and relevant regulations of power construction projects; 3. Understand relevant national and local government regulations, rules and policies; 4. Preside over the review of construction drawings and improve the design content; 5. Coordinate with equipment manufacturers	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Confirm project construction needs and goals; 1.2 Review construction drawings and plans; 1.3 Coordinate and schedule project resources; 1.4 Merge and review construction scheme documents.

and construction parties to improve engineering data; 6. Determine the installation process and electrical debugging requirements; 7. Implement environmental protection and water and soil conservation measures; 8. Prepare a detailed construction scheme; 9. Organize and complete the review and countersigning of the construction scheme for PV power subsystems. 10. Observe health, occupational and environmental safety rules and regulations.	**2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 The rationality and operability of the plan; 2.2 Construction period standards and dynamic management control principles; 2.3 Project acceptance standard requirements; 2.4 The principle of balancing comprehensive costs and benefits. **3.0 Theories** 3.1 Safety and quality control theory; 3.2 Engineering project management theory; 3.3 Solar PV generation theory; 3.4 Electrical debugging and installation theory. **4.0 Essential Skills** 4.1 Teamwork skills; 4.2 Written communication skills; 4.3 Communication skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	A construction scheme for the Solar PV power subsystem is prepared in accordance with the Solar PV module manufacturer specifications, the electrical engineering requirements of Solar PV power subsystems, the owner's goal and the inputs from the designer, and the supervising engineer.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	PREPARE A CONSTRUCTION SCHEME FOR ENERGY STORAGE SYSTEMS	**DUTY NO.**	802
TASK TITLE	PREPARE A CONSTRUCTION SCHEME FOR ENERGY STORAGE SUBSYSTEMS	**TASK NO.**	8023
PERFORMANCE CRITERIA	The person performing this task must be able to prepare a construction scheme for the energy storage subsystems in accordance with the Solar PV module manufacturer specifications, the energy storage systems engineering requirements, the owner's goal and the inputs from the designer, and the supervising engineer.		
RANGE STATEMENT:	The task can be performed under the supervision of project managers. The tools and equipment to be used include: 1. Computer set with computer-aided design software; 2. Engineering quality standard documents; 3. Engineering quality inspection method documents; 4. Power construction project specifications and requirement documents; 5. Documents for technical requirements of the energy storage subsystem project; 6. Construction drawings and documents for energy storage subsystems; 7. National and local energy storage systems construction rules, regulations and policy documents. 8. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Clarify the design requirements for the energy storage subsystems; 2. Master the technical requirements, acceptance standards and relevant regulations of power construction projects; 3. Understand relevant national and local government regulations, rules and policies; 4. Preside over the review of construction drawings and improve the design content; 5. Coordinate with equipment manufacturers	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Confirm project construction needs and goals; 1.2 Organize the review of construction drawings and plans; 1.3 Coordinate and schedule project resources; 1.4 Merge and review construction scheme documents.

and construction parties to improve engineering data; 6. Determine the installation process and electrical debugging requirements; 7. Implement environmental protection and water and soil conservation measures; 8. Prepare a detailed construction scheme; 9. Organize and complete the review and countersigning of the energy storage subsystems. 10. Observe health, occupational and environmental safety rules and regulations.	**2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 The rationality and operability of the plan; 2.2 Construction period standards and dynamic management control principles; 2.3 Project acceptance standard requirements; 2.4 The principle of balancing comprehensive costs and benefits. **3.0 Theories** 3.1 Safety and quality control theory; 3.2 Engineering project management theory; 3.3 Energy storage technology theory; 3.4 Electrical debugging and installation theory. **4.0 Essential Skills** 4.1 Teamwork skills; 4.2 Report writing skills; 4.3 Communication skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	A construction scheme document for the energy storage subsystem is prepared in accordance with, the energy storage engineering requirements and the inputs from the designer, and the, supervising engineer.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	PREPARE A CONSTRUCTION SCHEME FOR NEW ENERGY POWER STATIONS	**DUTY NO.**	802
TASK TITLE	PREPARE A CONSTRUCTION SCHEME FOR GRID-CONNECTION SUBSYSTEMS	**TASK NO.**	8024
PERFORMANCE CRITERIA	The person performing this task must be able to prepare a construction scheme for the grid connection subsystems in accordance with the manufacturer specifications, the grid-connection engineering requirements, the owner's goal and the inputs from the designer, and the supervising engineer.		
RANGE STATEMENT:	The task can be performed under the supervision of project managers. The tools and equipment to be used include: 1. Computer set with a computer-aided design software; 2. Engineering quality standard documents; 3. Engineering quality inspection method documents; 4. Power construction project specifications and requirement documents; 5. Documents for technical requirements of the grid-connection subsystem project; 6. Construction drawings and documents for grid-connection subsystems; 7. Documents for technical requirements of local power grid-connection access; 8. National and local grid-connection rules, regulations and policy documents. 9. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Determine the design requirements for grid-connection subsystems; 2. Master the technical requirements, acceptance standards and relevant regulations of power construction projects; 3. Understand relevant national and local government regulations, rules and policies;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Confirm project construction needs and goals; 1.2 Review and organize construction drawings and plans; 1.3 Coordinate and schedule project

4. Preside over the review of construction drawings and improve the design content; 5. Coordinate with equipment manufacturers and construction parties to improve engineering data; 6. Determine the installation process and electrical debugging requirements; 7. Implement environmental protection and water and soil conservation measures; 8. Prepare a detailed construction scheme; 9. Organize and complete the review and countersigning of the construction scheme for grid-connection subsystems. 10. Observe health, occupational and environmental safety rules and regulations.	resources; 1.4 Merge and review construction scheme documents. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 The rationality and operability of the plan; 2.2 Construction period standards and dynamic management control principles; 2.3 Project acceptance standard requirements; 2.4 The principle of balancing comprehensive costs and benefits. **3.0 Theories** 3.1 Safety and quality control theory; 3.2 Engineering project management theory; 3.3 Power system composition; 3.4 Electrical debugging and installation theory. **4.0 Essential Skills** 4.1 Teamwork skills; 4.2 Report writing skills; 4.3 Communication skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	A construction scheme document for the grid-connection subsystem is prepared in accordance with the manufacturer specifications, the grid-connection engineering requirements, the owner's goal and the inputs from the designer, and the supervising engineer.

OCCUPATION	RENEWABLE ENERGY ENGINEER	**OCCUPATION CODE**	
DUTY TITLE	PREPARE A CONSTRUCTION SCHEME FOR NEW SOLAR PV POWER STATIONS	**DUTY NO.**	802
TASK TITLE	PREPARE A CONSTRUCTION SCHEDULE PLAN	**TASK NO.**	8025
PERFORMANCE CRITERIA	The person performing this task must be able to prepare a construction schedule plan in accordance with the overall schedule requirements, the engineering quantities, investment resources and construction sequence.		
RANGE STATEMENT:	The task can be performed under the supervision of project managers. The tools and equipment to be used include: 1. Computer set with a computer-aided design software; 2. Engineering quality standard documents; 3. Engineering quality inspection method documents; 4. Detailed documents for construction resources; 5. Feasibility plan documents for new energy power stations; 6. Construction drawings and documents for new energy power stations; 7. Detailed documents for project resources. 8. Safety gear		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Determine the requirements for the overall progress target of the project; 2. Organize the review of construction drawings; 3. Organize the implementation of construction resources; 4. Conduct schedule risk analysis and risk control; 5. Determine project management methods and management teams; 6. Establish plan control methods and systems; 7. Conduct goal decomposition and determine key progress points;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Confirm project construction goals; 1.2 Review construction drawings and plans; 1.3 Assess construction progress and risks; 1.4 Merge and review construction progress documents. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 The rationality and operability of the schedule; 2.2 Construction period standards and dynamic

8. Prepare a detailed construction progress; 9. Complete the review and countersigning of construction schedules. 10. Observe health, occupational and environmental safety rules and regulations.	management control principles. **3.0 Theories** 3.1 Safety and quality control theory; 3.2 Engineering project management theory. **4.0 Essential Skills** 4.1 Teamwork skills; 4.2 Report writing skills; 4.3 Communication skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The construction schedule plans are prepared in accordance with the overall schedule requirements, the engineering quantities, investment resources and construction sequence
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	ENSURE THE MANAGEMENT OF THE CONSTRUCTION PROCESS OF ENERGY STORAGE SYSTEMS	**DUTY NO.**	803
TASK TITLE	CARRY OUT THE ENGINEERING TECHNICAL DISCLOSURE AND SAFETY AND QUALITY DISCLOSURE	**TASK NO.**	8031
PERFORMANCE CRITERIA	The person performing this task must be able to carry out the engineering technical disclosure and safety and quality disclosure in accordance with technical documents and policies and regulations.		
RANGE STATEMENT:	The task can be performed in the energy storage power station under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Overall technical scheme documents; 2. Documents of a whole set of drawings; 3. Construction scheme documents; 4. Quality supervision regulation documents; 5. Documents for work safety policies and regulations. 6. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Explain the project overview, design intent and requirements; 2. Explain the construction process and construction technology requirements; 3. Explain quality standards and acceptance requirements; 4. Prepare technical disclosure reports; 5. Prepare documents for construction site safety requirements; 6. Observe health, occupational and environmental safety rules and regulations. 7. Prepare a safety and quality disclosure report.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Interpret technical documents; 1.2 Interpret quality supervision and management regulations and regulatory documents; 1.3 Interpret documents for work safety policies and regulations. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Code for construction and acceptance of energy storage power stations;

	2.2 Code for construction safety management of energy storage power stations; 2.3 The system composition and working principle of energy storage power stations. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Quality standards and process requirements for energy storage power stations. **4.0 Essential Skills** 4.1 Management skills; 4.2 Communication skills; 4.3 Report writing skills; 4.4 Teamwork skills; 4.5 Computer application skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The engineering technical disclosure and the safety and quality disclosure carried out in accordance with the national and industrial technical quality requirements and safety and quality regulations.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	ENSURE THE MANAGEMENT OF THE CONSTRUCTION PROCESS OF ENERGY STORAGE SYSTEMS	**DUTY NO.**	803
TASK TITLE	DEVELOP A MATERIAL ENTRY PLAN AND MATERIAL ACCEPTANCE	**TASK NO.**	8032
PERFORMANCE CRITERIA	The person performing this task must be able to develop a material entry plan and accept materials in accordance with the construction plan and technical requirements.		
RANGE STATEMENT:	The task can be performed in the energy storage systems under the supervision of project managers. The tools and equipment to be used include: 1. Construction plan documents; 2. Material list documents; 3. Material acceptance specification documents; 4. In-station transportation equipment such as forklifts and cranes; 5. Computers and material management software. 6. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Develop a material entry schedule; 2. Inspect and accept materials; 3. Prepare a material acceptance report; 4. Manage the in-station transportation of materials; 5. Prepare a material receipt. 6. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Determine the material entry sequence in accordance with the construction plan; 1.2 Select appropriate acceptance tools and equipment; 1.3 Select suitable in-station transportation tools. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Principles of material procurement and inspection standards; 2.2 Material quality assurance standards.

	3.0 Theories The person performing this task must be able to explain the following: 3.1 Items and methods of material quality inspection; 3.2 Material supply assurance methods. **4.0 Essential Skills** 4.1 Management skills; 4.2 Communication skills; 4.3 Report writing skills; 4.4 Computer application skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The material entry plan, acceptance report and material receipt are developed in accordance with the construction plan and technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	ENSURE THE MANAGEMENT OF THE CONSTRUCTION PROCESS OF ENERGY STORAGE SYSTEMS	**DUTY NO.**	803
TASK TITLE	MANAGE THE MULTI-TEAM CONSTRUCTION AND COORDINATION OF CONSTRUCTION PROGRESS	**TASK NO.**	8033
PERFORMANCE CRITERIA	The person performing this task must be able to manage multi-team construction and coordinate construction progress in accordance with the construction plan and technical requirements.		
RANGE STATEMENT:	The task can be performed in the energy storage systems under the supervision of project managers. The tools and equipment to be used include: 1. Construction scheme documents; 2. Construction plan documents; 3. Documents for technical requirements of process; 4. Quality supervision regulation documents; 5. Documents for work safety policies and regulations. 6. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Manage multi-team construction; 2. Supervise construction safety; 3. Supervise the construction progress; 4. Supervise the maintenance of tools and equipment. 5. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Develop a construction process flowchart; 1.2 Develop construction safety plans and safeguard measures. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Construction site team management system; 2.2 Management standards for on-site construction work safety. **3.0 Theories**

	The person performing this task must be able to explain the following: 3.1 System composition of energy storage power stations; 3.2 Construction sequence and process. **4.0 Essential Skills** 4.1 Management skills; 4.2 Communication skills; 4.3 Report writing skills; 4.4 Teamwork skills; 4.5 Computer application skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The multi-team construction and coordination of construction is managed in accordance with the construction plan and technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	ENSURE THE MANAGEMENT OF THE CONSTRUCTION PROCESS OF ENERGY STORAGE SYSTEMS	**DUTY NO.**	803
TASK TITLE	PREPARE A DESIGN MODIFICATION REPORT BASED ON SUDDEN ON-SITE PROBLEMS	**TASK NO.**	8034
PERFORMANCE CRITERIA	The person performing this task must be able to prepare a design modification report based on sudden on-site problems in accordance with the overall plan and construction plan.		
RANGE STATEMENT	The task can be performed in the energy storage power station under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Overall technical scheme documents; 2. Documents of a whole set of drawings; 3. Construction scheme documents; 4. Construction plan documents. 5. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Verify the version of technical documents; 2. Review on-site design modifications; 3. Write a design modification report; 4. Execute the changed design documents and adjust the construction plan. 5. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Compare the on-site technical document version with the execution version; 1.2 Conduct on-site inspections on the rationality of design modifications; 1.3 Submit a change application in accordance with the prescribed process. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Engineering quality control regulation.

	3.0 Theories The person performing this task must be able to explain the following: 3.1 Analysis of the rationality of design modifications; 3.2 Design and change of the management system; 3.3 Change of the application process. **4.0 Essential Skills** 4.1 Management skills; 4.2 Communication skills; 4.3 Report writing skills; 4.4 Computer application skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	A design modification report based on sudden on-site problems is prepared in accordance with the in accordance with the overall plan and construction plan.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	ENSURE THE MANAGEMENT OF THE CONSTRUCTION PROCESS OF ENERGY STORAGE SYSTEMS	**DUTY NO.**	803
TASK TITLE	GUIDE THE INSTALLATION AND TROUBLESHOOTING OF SOLAR PV POWER SUBSYSTEMS	**TASK NO.**	8035
PERFORMANCE CRITERIA	The person performing this task must be able to guide the installation and troubleshooting of solar PV power subsystems in accordance with technical requirements and manufacturer's specifications.		
RANGE STATEMENT:	The task can be performed in the energy storage power station under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Overall technical scheme documents; 2. Documents of a whole set of drawings; 3. Installation tools such as wrench, socket, electric drill; 4. I-V curve tester and other testing tools. 5. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Guide the installation of front and rear columns, inclined beams and crossbeams, and level the supports; 2. Guide the installation of PV modules using bolts or pressing blocks; 3. Guide the selection of suitable ways to lay cables, such as trough racks and cable trenches; 4. Guide the use of I-V curve tester to detect PV string faults. 5. Carry out the debugging on the observed problems 6. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Guide the installation of PV supports; 1.2 Guide the installation of PV modules; 1.3 Guide the laying of cables; 1.4 Guide the detection of PV string faults. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Quality control regulations for the installation process of PV power subsystems; 2.2 Acceptance specifications and standards for

	PV power subsystems. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Installation steps and methods for PV power subsystems; 3.2 Detection and troubleshooting methods for PV string faults. **4.0 Essential Skills** 4.1 Management skills; 4.2 Communication skills; 4.3 Report writing skills; 4.4 Computer application skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The installation and troubleshooting of solar PV power subsystems is guided in accordance with the technical requirements and manufacturer's specifications and the pre-acceptance of the PV power subsystem.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	ENSURE THE MANAGEMENT OF THE CONSTRUCTION PROCESS OF ENERGY STORAGE SYSTEMS	**DUTY NO.**	803
TASK TITLE	GUIDE THE INSTALLATION AND TROUBLE SHOOT OF THE ENERGY STORAGE SUBSYSTEM	**TASK NO.**	8036
PERFORMANCE CRITERIA	The person performing this task must be able to guide the installation and troubleshooting of the energy storage subsystems in accordance with technical requirements and manufacturer's specifications.		
RANGE STATEMENT:	The task can be performed in the energy storage power station under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Overall technical scheme documents; 2. Documents of a whole set of drawings; 3. Installation tools such as wrench, socket, electric drill; 4. Testing tools such as multimeter, tramegger. 5. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Guide the lifting and fixing of energy storage cabinets; 2. Guide the installation of the Energy Storage Unit Battery Management System (BMS); 3. Guide the fixing of Power Conversion System and complete electrical connections; 4. Guide the setting of Battery Management System (BMS) parameters. 5. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Install energy storage cabinets; 1.2 Install the battery modules and connect the cables; 1.3 Install Power Conversion System; 1.4 Set parameters for battery cells, cluster tubes and array management units. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Technical requirements for installation and troubleshooting of energy storage systems; 2.2 Specifications for construction and operation

	of electrical energy storage systems; 2.3 Structure and principle of energy storage systems. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Installation and debugging steps of energy storage systems. **4.0 Essential Skills** 4.1 Management skills; 4.2 Communication skills; 4.3 Report writing skills; 4.4 Computer application skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The installation and troubleshooting of the energy storage subsystems are guided in accordance with technical requirements and manufacturer's specifications.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	ENSURE THE MANAGEMENT OF THE CONSTRUCTION PROCESS OF ENERGY STORAGE SYSTEMS	**DUTY NO.**	803
TASK TITLE	GUIDE THE INSTALLATION AND TROUBLESHOOTING OF THE GRID-CONNECTION SUBSYSTEM	**TASK NO.**	8037
PERFORMANCE CRITERIA	The person performing this task must be able to guide the installation and troubleshooting of the grid-connection subsystems in accordance with technical requirements and manufacturer's specifications.		
RANGE STATEMENT:	The task can be performed in the energy storage power station under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Overall technical scheme documents; 2. Documents of a whole set of drawings; 3. Installation tools such as wrench, socket, electric drill; 4. Testing tools such as multimeter, tramegger. 5. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Guide the installation of grid-connection cabinets; 2. Guide the installation and operation of control cabinets; 3. Guide the installation of the central control cabinet; 4. Guide the setting of inverter parameters; 5. Guide the setting of controller communication parameters. 6. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Lifte and fix the cabinet body; 1.2 Set parameters through the display screen. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Technical requirements for installation and debugging of grid-connection systems; 2.2 Specifications for construction and operation of electrical grid-connection systems; 2.3 Structure and principle of grid-connection systems.

	3.0 Theories The person performing this task must be able to explain the following: 3.1 Installation and debugging steps of grid-connection systems. **4.0 Essential Skills** 4.1 Management skills; 4.2 Communication skills; 4.3 Report writing skills; 4.4 Computer application skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The installation and troubleshooting of the grid-connection subsystem are guided in accordance with technical requirements and manufacturer's specifications and the pre-acceptance of the grid-connection subsystem.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	ENSURE THE MANAGEMENT OF THE CONSTRUCTION PROCESS OF ENERGY STORAGE SYSTEMS	**DUTY NO.**	803
TASK TITLE	COMPLETE THE OVERALL PRE-ACCEPTANCE OF THE POWER STATION	**TASK NO.**	8038
PERFORMANCE CRITERIA	The person performing this task must be able to complete the overall pre-acceptance of the power station and preparation of acceptance of materials in accordance with technical requirements.		
RANGE STATEMENT:	The task can be performed in the energy storage power station under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Overall technical scheme documents; 2. Documents of a whole set of drawings; 3. Multimeter; 4. Resistance tester; 5. Insulation and withstand voltage tester; 6. Comprehensive test system. 7. Safety gear		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Inspect the appearance and quantity of PV modules; 2. Detect the tilt angle deviation of PV module installation; 3. Inspect the appearance and internal wiring of the energy storage battery; 4. Test the working curve of the battery pack under the Battery Management System (BMS); 5. Detect the charging and discharging function of the bidirectional converter; 6. Test the efficiency of the inverter; 7. Prepare acceptance materials. 8. Observe health, occupational and	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Inspect the quantity and installation quality of equipment in accordance with technical documents; 1.2 Select appropriate tools to test the function and performance of the equipment. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Acceptance standards for energy storage power stations; 2.2 Construction quality inspection and

environmental safety rules and regulations.	acceptance regulations for energy storage power stations. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 The process and steps for acceptance of energy storage power stations; 3.2 Methods for detecting the function and performance of energy storage power station subsystems. **4.0 Essential Skills** 4.1 Management skills; 4.2 Communication skills; 4.3 Report writing skills; 4.4 Computer application skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The overall pre-acceptance of the power station and preparation of acceptance of materials are completed in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	ENSURE THE MANAGEMENT OF THE OPERATION AND MAINTENANCE OF ENERGY STORAGE SYSTEMS	**DUTY NO.**	804
TASK TITLE	DEVELOP THE INSPECTION PROCEDURES	**TASK NO.**	8041
PERFORMANCE CRITERIA	The person performing this task must be able develop the inspection procedure in accordance with national and industrial technical quality requirements and safety and quality.		
RANGE STATEMENT:	The task can be performed in the energy storage power station under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Overall technical scheme documents; 2. Documents of a whole set of drawings; 3. Inspection scheme documents; 4. Regulations and regulatory documents on quality supervision and management of energy storage power station project inspections; 5. Documents for safety inspection policies and regulations. 6. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Explain the equipment overview, design intent and requirements; 2. Explain the inspection process and requirements; 3. Explain quality standards and acceptance requirements; 4. Prepare technical disclosure reports; 5. Prepare documents for inspection site safety requirements; 6. Prepare a safety and quality disclosure report. 7. Observe health, occupational and environmental safety rules and regulations.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Interpret technical documents; 1.2 Interpret inspection quality supervision and management regulations and regulatory documents; 1.3 Interpret safety inspection policies and regulatory documents. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Code for inspection and acceptance of energy storage power stations;

	2.2 Safety management of energy storage power station inspections. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 System composition and inspection indicators of energy storage power stations; 3.2 Quality standards and inspection requirements for energy storage power stations. **4.0 Essential Skills** 4.1 Management skills; 4.2 Communication skills; 4.3 Report writing skills; 4.4 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The inspection procedure is developed in accordance with national and industrial technical quality requirements and safety and quality regulations.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety inspection terms; 2. Environmental protection measures at the inspection site; 3. Occupational health and safety; 4. Waste disposal methods.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	ENSURE THE MANAGEMENT OF THE OPERATION AND MAINTENANCE OF ENERGY STORAGE SYSTEMS	**DUTY NO.**	804
TASK TITLE	DEVELOP REGULAR SAFETY AND QUALITY TEST PROCEDURES	**TASK NO.**	8042
PERFORMANCE CRITERIA	The person performing this task must be able to develop regular safety and quality test procedures in accordance with technical documents and policies and regulations.		
RANGE STATEMENT:	The task can be performed in the energy storage power station under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Overall technical scheme documents; 2. Documents of a whole set of drawings; 3. Test scheme documents; 4. Regulations and regulatory documents on quality supervision and management of energy storage power station project tests; 5. Documents for safety test policies and regulations. 6. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Explain the project overview, design intent and requirements; 2. Explain the experimental process and technology; 3. Explain test quality standards and acceptance requirements; 4. Prepare test technology disclosure reports; 5. Prepare documents for test site safety requirements; 6. Prepare a test safety and quality disclosure report. 7. Observe health, occupational and	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Interpret experimental technical documents; 1.2 Interpret test quality supervision and management regulations and regulatory documents; 1.3 Interpret safety test policies and regulatory documents. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Code for test and acceptance of energy

environmental safety rules and regulations.	storage power stations; 2.2 Code for test safety management of energy storage power stations; 2.3 The system composition and working principle of energy storage power stations. **3.0 Theories** The person performing this task must be able to explain the following: 3.2 Test quality standards and test process requirements for energy storage power stations. **4.0 Essential Skills** 4.1 Management skills; 4.2 Communication skills; 4.3 Test report writing skills; 4.4 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The regular safety and quality test procedures are developed in accordance with the national and industrial technical quality requirements and safety test quality regulations.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Work safety terms; 2. Environmental protection measures at the test site; 3. Occupational health and safety; 4. Waste disposal methods.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	ENSURE THE MANAGEMENT OF THE OPERATION AND MAINTENANCE OF ENERGY STORAGE SYSTEMS	**DUTY NO.**	804
TASK TITLE	DEVELOP AN OVERHAUL SAFETY AND QUALITY TEST PLAN	**TASK NO.**	8043
PERFORMANCE CRITERIA	The person performing this task must be able to develop an overhaul safety and quality test plan in accordance with technical documents and policies and regulations.		
RANGE STATEMENT:	The task can be performed in the energy storage power station under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Overall technical scheme documents; 2. Documents of a whole set of drawings; 3. Overhaul scheme documents; 4. Regulations and regulatory documents on overhaul quality supervision and management of energy storage power station project; 5. Documents for safety overhaul policies and regulations. 6. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Explain the overhaul project overview, design intent and requirements; 2. Explain the overhaul process and technology; 3. Explain overhaul quality standards and acceptance requirements; 4. Prepare overhaul technology disclosure reports; 5. Prepare documents for overhaul site safety requirements; 6. Prepare a safety overhaul and quality disclosure report.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1. Interpret overhaul technology documents; 1.2. Interpret overhaul quality supervision and management regulations and regulatory documents; 1.3. Interpret safety overhaul policies and regulatory documents. **2.0 Principle** The person performing this task must be able to explain the following principles:

7. Observe health, occupational and environmental safety rules and regulations.	2.1 Code for overhaul and acceptance of energy storage power stations; 2.2 Safety overhaul for maintenance of energy storage power stations; 2.3 The system composition and working principle of energy storage power stations. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Overhaul quality standards and process requirements for energy storage power stations. **4.0 Essential Skills** 4.1 Management skills; 4.2 Communication skills; 4.3 Overhaul report writing skills; 4.4 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	An overhaul safety and quality test plan is developed in accordance with national and industrial technical quality requirements and maintenance safety quality regulations.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety overhaul terms; 2. Environmental protection measures at the overhaul site; 3. Occupational health and safety; 4. Waste disposal methods.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	ENSURE THE MANAGEMENT OF THE OPERATION AND MAINTENANCE OF ENERGY STORAGE SYSTEMS	**DUTY NO.**	804
TASK TITLE	DEVELOP THE OPERATIONAL PLAN FOR THE ANNUAL POWER GENERATION	**TASK NO.**	8044
PERFORMANCE CRITERIA	The person performing this task must be able to develop the operational plan for the annual power generation in accordance with technical documents and policies and regulations.		
RANGE STATEMENT:	The task can be performed in the energy storage power station under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Overall technical scheme documents; 2. Documents of a whole set of drawings; 3. Power generation operation plan documents; 4. Regulations and regulatory documents on power generation supervision and management of energy storage power station project; 5. Power generation operation policies and regulatory documents. 6. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Explain the project overview, design intent and requirements; 2. Explain the construction process and construction technology; 3. Explain the quality standards and acceptance requirements for power generation operation; 4. Prepare a technical disclosure report on power generation operation; 5. Prepare a document on safety requirements for power generation operation sites;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Interpret technical documents for power generation operation plans; 1.2 Interpret the quality supervision and management regulations and regulatory documents for power generation operation plans; 1.3 Interpret work safety policies and regulatory documents for power generation operation plans.

6. Prepare a safety and quality disclosure report for power generation operation. 7. Observe health, occupational and environmental safety rules and regulations.	**2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Specifications for the operation and inspection of the power generation capacity of energy storage power stations; 2.2 Safety management of power generation operation in energy storage power stations; 2.3 The system composition and working principle of energy storage power stations. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Quality standards and process requirements for the operation of energy storage power stations. **4.0 Essential Skills** 4.1 Management skills; 4.2 Communication skills; 4.3 Skills in writing power generation operation plan reports; 4.4 Teamwork skills
DESCRIPTION OF THE END PRODUCT / SERVICE	The operation plan for the annual power generation is developed in accordance with technical documents and policies and regulations.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Power generation operation terms; 2. Environmental protection measures at the power generation operation site; 3. Occupational health and safety; 4. Waste disposal methods.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	ENSURE THE MANAGEMENT OF THE OPERATION AND MAINTENANCE OF ENERGY STORAGE SYSTEMS	**DUTY NO.**	804
TASK TITLE	SUGGEST THE OPTIMIZATION PLANS FOR POWER STATIONS	**TASK NO.**	8045
PERFORMANCE CRITERIA	The person performing this task must be able to suggest the optimization plans for the power station in accordance with the technical documents, national and international policies and regulations and the existing productivity of the station.		
RANGE STATEMENT:	The task can be performed in the energy storage power station under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Overall technical scheme documents; 2. Documents of a whole set of drawings; 3. Power station optimization plan documents; 4. Regulations and regulatory documents on quality supervision and management of energy storage power station projects; 5. Documents for power station optimization work safety policies and regulations. 6. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Explain the power station optimization project overview, design intent and requirements; 2. Explain the optimization process and technology of the power station; 3. Explain the quality standards and acceptance requirements for power station optimization; 4. Prepare a technical disclosure report for power station optimization; 5. Prepare a safety requirement document	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1. Interpret the technical documents for power station optimization; 1.2. Interpret the regulations and regulatory documents on quality supervision and management of power station optimization; 1.3. Interpret the policy and regulatory documents for optimizing work safety in power stations.

for optimizing the construction site of a power station; 6. Prepare a safety and quality disclosure report for power station optimization. 7. Observe health and environmental safety rules and regulations.	**2.0 Principle** The person performing this task must be able to explain the following principles: 2.1. Code for optimization and acceptance of energy storage power stations; 2.2. Safety management for optimization of energy storage power stations; 2.3. The optimization system composition and working principle of energy storage power stations. **3.0 Theories** The person performing this task must be able to explain the following: 3.1. Optimization quality standards and process requirements for energy storage power stations. **4.0 Essential Skills** 4.1. Management skills; 4.2. Communication skills; 4.3. Skills in writing optimization plan reports; 4.4. Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The optimization plans for the power station are suggested in accordance with national and industrial technical quality requirements, safety quality regulations and the productivity plans of the power station.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Work safety terms; 2. Environmental protection measures at the power station optimization site; 3. Occupational health and safety; 4. Waste disposal methods.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	ORGANIZE AND CONDUCT GUIDANCE AND TRAINING	**DUTY NO.**	805
TASK TITLE	CONDUCT BASIC OPERATIONAL SKILLS TRAINING FOR PERSONNEL	**TASK NO.**	8051
PERFORMANCE CRITERIA	The person performing this task must be able to conduct basic operational skills training for personnel in accordance with technical requirements and government policies.		
RANGE STATEMENT:	The task can be performed on site and indoors under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Relevant national and local government regulations, rules and policy documents; 2. Current technical documents related to safety technology standards, regulations and products; 3. Computer and computer-aided design software; 4. Technical index documents related to project preparation, construction and installation, and organization and acceptance. 5. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Carry out tasks based on health and safety precautions; 2. Guide the whole cycle of survey, design and construction of renewable energy engineering projects; 3. Guide specific personnel and subsystem engineering to assign specific duties and responsibilities; 4. Evaluate the results; 5. Conduct real-time monitoring of project progress; 6. Develop training needs and goals; 7. Develop a training program; 8. Conduct training implementation and coordination work;	**1.0 Methods** The person performing this task must be able to explain how to: 1.1 Determine the construction goals and requirements of the engineering project; 1.2 Approve, design, accept, operate and maintain PV projects. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Main forms of solar energy utilization and operating principles of PV power generation; 2.2 Implementation schemes, construction and acceptance specifications of renewable energy engineering.

9. Conduct a training summary. 10. Observe health, occupational and environmental safety rules and regulations.	**3.0 Theories** The person performing this task must be able to explain the following principles: 3.1 Safety and quality control; 3.2 Engineering project management; 3.3 Standard process flow; 3.4 Guidance and training on relevant skills and safety knowledge. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Skills in using computer-aided design software; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The basic operational skills training for personnel is conducted in accordance with the users' operation guidelines and the technical requirements and contract agreements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management; 5. Water and soil conservation.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	ORGANIZE AND CONDUCT GUIDANCE AND TRAINING	**DUTY NO.**	805
TASK TITLE	CONDUCT TRAINING ON THE INSTALLATION AND OPERATION OF SOLAR PV POWER SUBSYSTEMS	**TASK NO.**	8052
PERFORMANCE CRITERIA	The person performing this task must be able to conduct training on the installation and operation of solar PV power subsystems in accordance with the technical requirements and the installation and operation manuals of the power system.		
RANGE STATEMENT:	The task can be performed on site and indoors under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Relevant national and local government regulations, rules and policy documents; 2. Computer set with computer-aided design software; 3. Engineering quality standard documents; 4. Power construction project specifications and requirement documents; 5. Regulations and legal and regulatory documents on the quality control of PV power subsystem engineering technology. 6. Safety gear		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Determine the project design requirements, technical requirements and acceptance standards for PV power subsystems; 2. Guide specific personnel and PV power subsystem engineering to assign specific duties and responsibilities; 3. Conduct real-time monitoring of project progress; 4. Evaluate results; 5. Hold the staff meetings; 6. Develop training needs and goals; 7. Develop a training program;	**1.0 Methods** The person performing this task must be able to explain how to: 1.1 Determine the construction goals and requirements of the engineering project; 1.2 Operate inverters and maintain PV systems; 1.3 Coordinate and guide the implementation of PV power subsystem projects. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Design requirements, implementation plans, project construction and acceptance specifications for PV power subsystems;

8. Conduct training implementation and coordination work; 9. Conduct a training summary. 10. Observe health, occupational and environmental safety rules and regulations.	2.2 The principle of overall dynamic and controllable construction period; 2.3 The completeness of the training program. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 The principle and characteristics of PV power generation; 3.2 The composition and type of PV generation system; 3.3 Electrical debugging and installation theory. **4.0 Essential Skills** 4.1 Management skills; 4.2 Communication skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The training on the installation and operation of PV power subsystems is conducted in accordance with the technical requirements and the installation and operation manuals of the power subsystems
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	ORGANIZE AND CONDUCT GUIDANCE AND TRAINING	**DUTY NO.**	805
TASK TITLE	CONDUCT TRAINING ON THE INSTALLATION AND OPERATION OF ENERGY STORAGE SUBSYSTEMS	**TASK NO.**	8053
PERFORMANCE CRITERIA	The person performing this task must be able to conduct training on the installation and operation of energy storage subsystems in accordance with technical requirements and government policies in accordance with the technical requirements and the installation and operation manuals of the energy storage subsystems.		
RANGE STATEMENT:	The task can be performed on site and indoors under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Relevant national and local government regulations, rules and policy documents; 2. Computer and computer-aided design software; 3. Engineering quality standard documents; 4. Power construction project specifications and requirement documents; 5. Regulations and regulatory documents on quality supervision and management of energy storage subsystem projects. 6. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Master new energy storage group application technology, system integration technology and energy storage power supply system engineering technology; 2. Determine the project design requirements, technical requirements and acceptance standards for energy storage subsystems; 3. Guide specific personnel and energy storage system engineering to assign specific duties and responsibilities; 4. Conduct real-time monitoring of project	**1.0 Methods** The person performing this task must be able to explain how to: 1.1 Determine the construction goals and requirements of the engineering project; 1.2 Master the technical indexes of the energy storage power supply system; 1.3 Coordinate and guide the implementation of energy storage system projects. **2.0 Principle** The person performing this task must be able to explain the following principles:

progress; 5. Evaluate results; 6. Hold the staff meetings; 7. Develop training needs and goals; 8. Develop a training program; 9. Conduct training implementation and coordination work; 10. Conduct a training summary. 11. Observe health, occupational and environmental safety rules and regulations.	2.1 Design requirements, implementation plan, project construction and acceptance specifications for the energy storage subsystem; 2.2 The principle of overall dynamic and controllable construction period; 2.3 The completeness of the training program. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Underpinning knowledge of energy storage; 3.2 Application scenarios for energy storage; 3.3 New type of energy storage technology; 3.4 Electrical debugging and installation theory. **4.0 Essential Skills** 4.1 Management skills; 4.2 Communication skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The training on the installation and operation of energy storage subsystems is conducted in accordance with the technical requirements and the installation and operation manuals of the energy storage subsystems.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	ORGANIZE AND CONDUCT GUIDANCE AND TRAINING	**DUTY NO.**	805
TASK TITLE	CONDUCT TRAINING ON THE INSTALLATION AND OPERATION OF GRID-CONNECTION SUBSYSTEMS	**TASK NO.**	8054
PERFORMANCE CRITERIA	The person performing this task must be able to conduct training on the installation and operation of grid-connection subsystems in accordance with the technical requirements and the installation and operation manuals of grid-connection subsystems.		
RANGE STATEMENT:	The task can be performed on site and indoors under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Relevant national and local government regulations, rules and policy documents 2. Computer and computer-aided design software; 3. Engineering quality standard documents; 4. Specification and requirement documents for power construction project; 5. Quality control regulations and legal and regulatory documents for the grid-connection subsystem project. 6. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Determine the project design requirements, technical requirements and acceptance standards for grid-connection subsystems; 2. Guide specific personnel and grid-connection subsystem engineering to assign specific duties and responsibilities; 3. Conduct real-time monitoring of project progress; 4. Evaluate results; 5. Hold the staff meetings; 6. Develop training needs and goals;	**1.0 Methods** The person performing this task must be able to explain how to: 1.1 Determine the construction goals and requirements of the grid-connection engineering project; 1.2 Coordinate and guide the implementation of grid-connection subsystem projects; 1.3 Provide guidance and training on grid-connection definitions, conditions and problems that may arise during the grid-connection process. **2.0 Principle** The person performing this task must be able to

7. Develop a training program; 8. Conduct training implementation and coordination work; 9. Conduct a training summary. 10. Observe health, occupational and environmental safety rules and regulations.	explain the following principles: 2.1 Design requirements, implementation plan, project construction and acceptance specifications for the grid-connection subsystem; 2.2 Overall dynamic controllability of the construction period; 2.3 The completeness of the training program. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Grid-connection system scheme; 3.2 Principle of project approval and engineering construction; 3.3 Grid-connection acceptance and debugging methods; 3.4 Professional qualification for project operation. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Skills in using computer-aided design software; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The training on the installation and operation of grid-connection subsystems conducted in accordance with technical requirements and the installation and operation manuals of the energy storage subsystems.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	ADAPT NEW TECHNOLOGIES TIMELY	**DUTY NO.**	806
TASK TITLE	CONDUCT RESEARCH AND CHOOSE THE APPROPRIATE NEW TECHNOLOGY AND PROCESS	**TASK NO.**	8061
PERFORMANCE CRITERIA	The person performing this task must be able to conduct research and choose the appropriate new technology and process in accordance with technical and engineering requirements and the market demand products from new technologies		
RANGE STATEMENT:	The task can be performed in the energy storage power station under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Computer; 2. Telephone; 3. Survey questionnaire documents; 4. Documents, books and other reading materials.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Determine the survey objective; 2. Release demand questionnaire; 3. Refer to documents, books and other materials; 4. Participate in industry conferences or exhibitions; 5. Conduct field research; 6. Collect and analyze survey data; 7. Write technical survey report.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Obtain new technology and process through methods such as questionnaire; 1.2 Analyze data through methods such as differential analysis and comparative analysis. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Design specifications for energy storage power stations; 2.2 Technical requirements for performance evaluation of energy storage power stations.

	3.0 Theories The person performing this task must be able to explain the following: 3.1 Collect methods for new technology and process; 3.2 Methods of writing a survey report. **4.0 Essential Skills** 4.1 Computer application skills; 4.2 Communication skills; 4.3 Data analysis skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The research is conducted and the new technology and process are chosen in accordance with the technical and engineering requirements and the market demand for new product from new technologies. s
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	ADAPT NEW TECHNOLOGIES TIMELY	**DUTY NO.**	806
TASK TITLE	CARRY OUT THE CUSTOMER NEEDS ASSESSMENT	**TASK NO.**	8062
PERFORMANCE CRITERIA	The person performing this task must be able to carry out the customer needs assessment aiming at improving the product design scheme in accordance with the collected customer needs.		
RANGE STATEMENT:	The task can be performed in the energy storage power station under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Computer set; 2. Internet connection and telephone; 3. Survey questionnaire documents; 4. Design scheme documents.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Release demand questionnaire; 2. Interview people by phone; 3. Conduct visits and investigations; 4. Collect and analyze survey data; 5. Write a survey report on customer needs.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Collect customer needs through methods such as questionnaire; 1.2 Analyze data through methods such as differential analysis and comparative analysis. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Design specifications for energy storage power stations; 2.2 Technical requirements for performance evaluation of energy storage power stations. **3.0 Theories** The person performing this task must be able to

	explain the following: 3.1 Methods for collecting customer needs; 3.2 Methods of writing a survey report. **4.0 Essential Skills** 4.1 Computer application skills; 4.2 Communication skills; 4.3 Data analysis skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The customer needs assessment is carried out and a report on customer needs is written in accordance with the findings.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

OCCUPATION	RENEWABLE ENERGY ENGINEER (SOLAR)	**OCCUPATION CODE**	
DUTY TITLE	ADAPT NEW TECHNOLOGIES TIMELY	**DUTY NO.**	806
TASK TITLE	ENSURE TIMELY PROCUREMENT PROCESS OF THE QUALITY MATERIALS FOR THE NEW TECHNOLOGY	**TASK NO.**	8063
PERFORMANCE CRITERIA	The person performing this task must be able to ensure timely procurement process of the quality materials for the new technology in accordance with engineering quality requirements of the new technology to ensure procurement quality.		
RANGE STATEMENT:	The task can be performed in the energy storage power station under the supervision of senior engineers or project managers. The tools and equipment to be used include: 1. Computer set; 2. Internet network and telephone; 3. Quality system and management method documents.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Evaluate indicators such as supplier management system, product quality and reputation; 2. Specify important terms such as quality, specification, quantity and delivery time for the purchased materials; 3. Test whether the quality and specifications of the sample meet the requirements; 4. Optimize the procurement process through procurement software.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Review supplier qualifications; 1.2 Sign a procurement contract; 1.3 Test the samples before procurement. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Bidding procurement laws, regulations and policies; 2.2 Quality control standards for material procurement. **3.0 Theories** The person performing this task must be able to

	explain the following: 3.1 Methods of evaluating suppliers; 3.2 Sample detection methods. **4.0 Essential Skills** 4.1 Computer application skills; 4.2 Communication skills; 4.3 Data analysis skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Timely procurement process of the quality materials for the new technology is ensured in accordance with the technical requirements and the findings from the customer needs assessment.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Relevant national and local government regulations and policies; 2. Occupational health and safety; 3. Waste disposal methods; 4. Environmental protection and safety management.

APPENDIX: DACUM CHARTS FOR RENEWABLE ENERGY ENGINEER (SOLAR) - NTA LEVEL 8

DUTIES	TASKS	ENABLERS
1.0 Design the scheme for the construction of the energy storage systems	1.1 Analyze the needs for the construction of energy storage systems 1.2 Analyze the consistency of solar energy resources. 1.3 Select the type and capacity of the energy storage systems. 1.4 Select the site and arrange the station area. 1.5 Design the electrical technical scheme for energy storage systems. 1.6 Conduct and prepare a feasibility study report.	**General skills and knowledge** · Communication skills · Teamwork skills · Technical drawing interpretation knowledge · Report writing skills **Tools and equipment** · Computers and computer-aided design software · Printers and scanners · A manual for equipment selection · Solar energy resource measuring instrument · GPS instrument **Materials** · Printing consumables such as toner cartridges and ink cartridges · Binding supplies such as binding clips and rubber rings · Printing paper, fax paper and other office paper · Folders such as board clips and data books **Requirements for employees** · Carefulness and conscientiousness · Honesty and trustworthiness · Solidarity and cooperation
2.0 Prepare a construction scheme for new energy power stations	2.1 Prepare a construction scheme for the infrastructure construction of the new energy power stations.	**General skills and knowledge** · Communication skills · Teamwork skills

DUTIES	TASKS	ENABLERS
	2.2 Preparation of a construction scheme for Solar PV power subsystems. 2.3 Prepare a construction scheme for energy storage subsystems. 2.4 Prepare a construction scheme for grid-connection subsystems. 2.5 Prepare a construction schedule plan.	· Technical drawing interpretation knowledge · Report writing skills · Skills in using computer-aided design software **Tools and equipment** · Computer · Design scheme documents · Documents on engineering quality inspection methods · Specification and requirement documents for power construction project; **Materials** · Printing consumables such as toner cartridges and ink cartridges · Binding supplies such as binding clips and rubber rings · Printing paper, fax paper and other office paper · Folders such as board clips and data books **Requirements for employees** · Carefulness and conscientiousness · Honesty and trustworthiness · Solidarity and cooperation
3.0 Ensure the management of the construction process of energy storage systems	3.1 Carry out the engineering technical disclosure and safety and quality disclosure. 3.2 Develop a material entry plan and material acceptance. 3.3 Manage the multi-team construction and coordination of	**General skills and knowledge** · Communication skills · Teamwork skills · Technical drawing interpretation knowledge · Report writing skills · Guidance and training skills **Tools and equipment**

DUTIES	TASKS	ENABLERS
	construction progress.	· Installation tools such as wrench, socket, electric drill · Testing tools such as multimeter, tramegger **Materials** · Traverse · Fuse tube · Insulation tape · Heat shrinkable tube **Requirements** for **employees** · Carefuommunication
	3.4 Prepare a design modification report based on sudden on-site problems.	
	3.5 Guide the installation and troubleshooting of solar PV power subsystems.	
	3.6 Guide the installation and troubleshooting of the energy storage subsystem.	
	3.7 Guide the installation and troubleshooting of the grid-connection subsystem.	
	3.8 Complete the overall pre-acceptance of the power station and preparation of acceptance of materials.	
4.0 Ensure the Management of the operation and maintenance of energy storage systems	4.1 Develop the inspection procedures.	**General skills and knowledge** · Communication skills · Teamwork skills · Skills in using computer-aided design software · Technical drawing interpretation knowledge · Report writing skills **Tools and equipment** · Clamp multimeter, temperature tester, leakage tester, screwdriver, wrench, electrician's plier, etc **Materials** · Traverse · Fuse tube
	4.2 Develop regular safety and quality test procedures.	
	4.3 Develop an overhaul safety and quality test plan.	
	4.4 Develop the operational plan for the annual power generation.	
	4.5 Suggest the optimization plans for power stations.	

DUTIES	TASKS	ENABLERS
		· Toner cartridge, ink cartridge and other office supplies · Insulation tape, heat shrinkable tube **Requirements for employees** · Carefulness and conscientiousness · Honesty and trustworthiness · Teamwork
5.0 Organize and conduct guidance and training	5.1 Conduct basic operational skills training for personnel 5.2 Conduct training on the installation and operation of solar PV power subsystems. 5.3 Conduct training on the installation and operation of energy storage subsystems. 5.4 Conduct training on the installation and operation of grid-connection subsystems.	**General skills and knowledge** · Communication skills · Teamwork skills · Reading of project manuals · Interpretation of technical data · Skills in using computer-aided design software · Report writing skills **Tools and equipment** · Relevant national and local government regulations, rules and policy documents · Current technical documents related to safety technology standards, regulations and products · Computer and computer-aided design software · Technical index documents related to project preparation, construction and installation, and organization and acceptance · Engineering quality standard documents

DUTIES	TASKS	ENABLERS
		· Specification and requirement documents for power construction project **Materials** · Traverse · Fuse tube · Insulation tape, heat shrinkable tube · Toner cartridge, ink cartridge and other office supplies **Requirements for employees** · Carefulness and conscientiousness · Honesty and trustworthiness · Teamwork
6.0 Adapt new technologies timely (Technical exchange)	6.1 Conduct research and choose the appropriate new technology and process. 6.2 Carry out the customer needs assessment. 6.3 Ensure timely procurement process of the quality materials for the new technology.	**General skills and knowledge** · Communication skills · Teamwork skills · Interpretation of technical drawings · Contract management skills · Buying and selling negotiation skills **Tools and equipment** · Computer · Design scheme documents · Documents, books and other reading materials · Quality system and management method documents **Materials** · Printing consumables such as toner cartridges and ink cartridges · Binding supplies such as binding clips and rubber rings

DUTIES	TASKS	ENABLERS
		· Printing paper, fax paper and other office paper · Folders such as board clips and data books **Requirements for employees** · Carefulness and conscientiousness · Honesty and trustworthiness · Solidarity and cooperation