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## ANNEX 1 – Description of the Action

### United Republic of Tanzania

**Project Title:** Implementation of the Tanzania Energy Efficiency Action Plan  
CONTRIBUTION AGREEMENT FED/2021/ 429-519

#### **Brief Description**

The overall objective of the Project is to ensure access to affordable, reliable, sustainable, and modern energy for all in Tanzania. The specific objective is to fast track a first set of Eight (8) key Energy Efficiency actions and to prepare a comprehensive updated Energy Efficiency Action Plan, which will be integrated with the Tanzania Energy Efficiency Strategy (TEES) to support the implementation of the National Energy Policy and strategic goals set by the Tanzania National Development Vision 2025, in terms of ensuring that Energy Efficiency plays a key role in contributing to the economic and social development of the country. The Energy Efficiency Action plan aims at achieving five strategic Energy Efficiency improvement objectives in the: charcoal and firewood consumptions; industry and public utilities; transport sector; buildings; and implementing cross-cutting measures supporting Energy Efficiency.

This Project is designed to contribute to achieving Energy Efficiency in households, industry and public utilities, and buildings through the implementation of the seven key Energy Efficiency actions. The Project is expected to help the country in strengthening Legal, Regulatory, Institutional framework, and administrative actions to support implementation and introduction of Energy Efficiency actions; help large energy consumers and general users to identify and implement quantifiable investments in Energy Efficiency; help in capacity and skills development, jobs creation and increase employability in the Energy Efficiency and Renewable Energy services and technology sector particularly for women and youth; and increase public awareness, access to information, stakeholder dialogue and visibility of financial, economic, and societal benefits of Energy Efficiency and Renewable Energy.

## ACRONYMS

BC	Building Certifiers
CTI	Confederation of Tanzania Industries
DIT	Dar es Salaam Institute of Technologies
EA	Energy Auditors
EAC	East Africa Community
EACREEE	The East African Centre of Excellence for Renewable Energy and Efficiency
EE	Energy Efficiency
EEBC	Energy Efficiency Building Codes
EELA	The Energy Efficient Lighting and Appliances
EM	Energy Managers
EPC	Energy Performance Certificate
EU	European Union
EWURA	Energy and Water Utilities Regulatory Authority
MEPS	Minimum Energy Performance Standards
MOE	Ministry of Energy
MOF	Ministry of Finance
MTE	Mid-Term Evaluation
NAO	National Authorizing Office
NBS	National Bureau of Statistics
PB	Project Board
PCU	Project Coordination Unit
PMU	Project Management Unit
PO-RALG	President's Office-Regional Administration and Local Government Authorities
REA	Rural Energy Agency
SADC	Southern Africa Development Community
SE4ALL	UN Sustainable Energy for All (SE4ALL)
TANESCO	Tanzania Electricity Supply Company
TBS	Tanzania Bureau of Standards
TEES	Tanzania Energy Efficiency Strategy
TIRDO	Tanzania Industrial Research Development Organization
TPDC	Tanzania Petroleum Development Company
TPSF	Tanzania Private Sector Foundation
TRA	Tanzania Revenue Authority
UNDP	United Nations Development Programme
WD	Working days

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## I. DEVELOPMENT CHALLENGES

The Tanzania National Energy Policy 2015, outlines priorities for the energy sector, including Energy Efficiency and Conservation. The Policy recognises that Energy Efficiency measures have the potential of scaling down capital investment needed to provide additional energy. Insufficient energy supply and poor reliability of electricity hinders the country's social-economic transformation agenda. Power demand is expected to grow rapidly as the economy grows and rural electrification programmes are being rolled out.

The Energy Efficiency measures can make the energy industry more efficient and gender inclusive, competitive, and improve delivery of public services through reduced energy costs, especially for large consumers. Investing in gender responsive Energy Efficiency creates jobs, fosters inclusive economic growth and is key in mitigating climate change. Several Energy Efficiency initiatives were implemented in the past in Tanzania in different areas, implementation of some of the initiatives was not a well-coordinated approach, and without regulations, standards, or incentives in place to assist the country in improving the Energy Efficiency. Given the potential of Energy Efficiency for the industrial and economic development of the country and based on best practices elsewhere, the Ministry of Energy, with the support from European Union, realized a long-term Energy Efficiency Strategy as one of the policy-implementation tools that will put in place strategic objectives, targets and identified actions. Through the 5-year Sustainable Energy for All (SE4ALL) Implementation Programme supported by UNDP, the Ministry of Energy also developed the "First Energy Efficiency Action Plan" that will be used to implement identified quick win actions and prepare for a comprehensive updated National Energy Efficiency Action Plan in line with the Energy Efficiency Strategy. Opportunities to capitalize on commitments through support for the implementation of the Energy Efficiency Strategy and the Energy Efficiency Action Plan are therefore critical.

This Project is designed to ensure access to affordable, reliable, sustainable, and modern energy in Tanzania by improving efficiency supply and consumption of energy. The streamlined Energy Efficiency actions will make energy sector in Tanzania more sustainable, gender inclusive and climate smart. This will result in quantifiable energy savings, promote gender inclusive skills development, job creation, investment in Energy Efficiency infrastructure and clean energy technologies. The legal, regulatory, and institutional set-up, including administration actions, will be strengthened to support Energy Efficiency, investment in energy efficiency and renewable energy measures identified in the Energy Efficiency Action Plan will be implemented, skills will be developed, jobs created, and employability increased, particularly for women and youth, in the Energy Efficiency and Renewable Energy technology sector. Public awareness, access to information, stakeholders' dialogue, and visibility of financial, economic, and social benefits of efficient and renewable energy will also increase.

This Project complements other EU funded programmes in Tanzania, including the Rural Electrification programme with REA, the Integrated Approach to Sustainable Cooking Solutions, ElectriFi and the Energy Sector Reform Programme.

This Project is relevant for the UN 2030 Agenda for Sustainable Development and the UN Sustainable Energy for All (SE4ALL) Initiative. It contributes directly towards achievement of SDG 7, but also promotes progress towards Goal 13 on Climate Actions. Both SE4ALL and SDG 7 are set to ensure access to affordable, reliable, sustainable, and modern energy for all, including doubling the global rate of improvement in Energy Efficiency. This Project is also aligned with the strategic goals set by the Tanzania National Development Vision 2025 and the National Energy Policy that ensures sustainable development of Tanzania is also supported by diversified, reliable and affordable energy supply that will contribute to reduction in energy losses.

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## II. STRATEGY

The overall objective of the Project is to ensure access to affordable, reliable, sustainable, and modern energy for all in Tanzania. The specific objective is to fast track a first set of eight key Energy Efficiency actions and to prepare a comprehensive updated Energy Efficiency Action Plan in line with the Tanzania Energy Efficiency Strategy which will be developed as well. The TEES to be developed will cover Energy Efficiency in all energy demand sectors (industry and utilities, transport, households, and buildings) with quantifiable Energy Efficiency targets for households, industry, and water supply sectors and to support the implementation of the National Energy Policy and strategic goals set by the Tanzania National Development Vision 2025 in making the Energy Efficiency one of the backbones of the economic and social development of the country. The TEES could among others, aimed at achieving strategic objectives such as:

- (a) Improving Energy Efficiency in charcoal and firewood consumption,
- (b) Improving Energy Efficiency in industry and public utilities,
- (c) Improving Energy Efficiency on transport sector,
- (d) Improving Energy Efficiency in buildings,
- (e) Implementing cross-cutting measures supporting Energy Efficiency.

The Project is designed to contribute mainly to the attaining of strategic objectives (b) (d) and (e) through the implementation of the following eight key Energy Efficiency actions:

- **Action 1:** Review and update the Energy Efficiency Action Plan and prepare the Energy Efficiency Strategy to be aligned with the Action Plan
- **Action 2:** Development of Minimum Energy Performance Standards (MEPS) and Labelling
- **Action 3:** Development and implementation of a framework for energy performance certification in large buildings
- **Action 4:** Enhance Energy Consumption Data of Large Energy Consumers
- **Action 5:** Development and implementation of a framework for management of large energy consumers
- **Action 6:** Development of professional qualifications and skills in Energy Management and Audit
- **Action 7:** Create Energy Efficiency Awareness of the Public
- **Action 8:** Project Management, which include Project Coordination Unit and Project Management Unit coordinating and facilitating the implementation of the Actions.

Through the implementation of these Actions, the Project is expected to achieve the following key development results:

- **Result 1:** The Legal, Regulatory, Institutional set-up, including administrative actions, will be strengthened to support implementation and introduction of EE actions (Action 1, 2, 3).
- **Result 2:** Quantifiable Investments in Energy Efficiency identified and implemented by large energy users (Action 4, 5).
- **Result 3:** Capacity and skills developed, jobs created, and employability increased, particularly for women and youth in the EE and RE services and technology sector (Action 6).
- **Result 4:** Public Relations and awareness, access to information, stakeholder dialogue and visibility of financial, economic, and societal benefits of Energy Efficiency and renewable energy increased (Action 7).

Energy efficiency being cross-cutting, all actions will be implemented through the coordination of the Ministry of Energy. In particular, the Ministry of Energy will:

- act as Implementing body for all actions;

- validate and coordinate the delivery of new regulations, standards, reforms, and legislations elaborated and developed in the framework of all actions;
- coordinate all consultative meetings, workshops and committees involving all relevant implementing partners for each action;
- organize conferences and events in addition to those implemented in the framework of Action 7-Awareness raising.

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### III. RESULTS AND PARTNERSHIPS

#### Specific Actions, Activities and Results

For each Action, the following activities will be implemented, with the mentioned below expertise required, procurement of supplies and indicative budget for supplies and public information. Project Coordination Unit activities are described in Action 8. The procurement of equipment and goods will be performed through UNDP.

The numbering of the activities and sub-activities of the Actions 1 to 8 is reflected in the working budget agreed between UNDP and EU in the preparation of this action with the aim of facilitating the monitoring of the Actions. For interpreting the provisions of the article 11.3 of the General Conditions, only the budget in Annex 3 is relevant and of contractual value.

#### Action 1: Review and update the Energy Efficiency Action Plan and prepare the Energy Efficiency Strategy to be aligned with the Action Plan

##### Activities:

- 1.1 Prepare the Energy Efficiency Strategy
  - 1.1.1 Technical working sessions of the Government Task Team to review related initiatives and prepare the Draft EE Strategy
  - 1.1.2 Consultation workshop with all involved stakeholders
  - 1.1.3 Update of the Energy Efficiency Strategy draft by the Consultant
  - 1.1.4 Validation Workshop of the EE Strategy
- 1.2 Review and update the First Energy Efficiency Action Plan draft
  - 1.2.1 Technical working sessions of the Government Task Team to review and prepare the Draft EE Action Plan
  - 1.2.2 Consultation workshop with all involved stakeholders
  - 1.2.3 Update of the Energy Efficiency Action Plan draft
  - 1.2.4 Validation workshop of the EE Action Plan

##### Implementation approach and results:

- The Ministry of Energy (MOE) will be the main implementing Agency for this action in collaboration with other implementing agencies.
- The preparation of the draft Energy Efficiency strategy will be performed at the beginning of the Project.
- The update of Energy Efficiency Action Plan will be performed at the beginning of the Project.
- The MoE will coordinate all other implementing agencies, consultative meetings, workshops, and committees involving the stakeholders.

##### Resources required to achieve the expected results

##### Human resources

- 1) Short-term International Expert(s): 46 WD

- 2) Short-term National Expert(s): 46 WD
- 3) Government Task Team<sup>1</sup> working sessions: 2 sessions of 5 days each.

## **Action 2: Development of Minimum Energy Performance Standards (MEPS) and Labelling**

### **Activities:**

- 2.1 Create a MEPS National Committee for an ongoing consultation of all stakeholders involved and organize its activities.
  - 2.1.1 Identify stakeholders to involve in the Committee: MoE, Ministry of Industry and Trade, EWURA, TANESCO, TBS, TRA, companies performing Pre-Shipment Verification of Conformity, regional programs, representatives of local manufacturers, importers, distributors, and retailers, etc.;
  - 2.1.2 Definition of duties and functions of the MEPS Committee;
  - 2.1.3 Identification and assignment of the MEPS National Committee members;
  - 2.1.4 Creation of the organizational office of the MEPS National Committee within the MOE;
  - 2.1.5 Definition of procedures of convocation and communication of the Committee;

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<sup>1</sup> The Government task team will be composed of experts from MoE and its institutions. Other members will be derived from the academic, research institutions, DPs, private sector, and NGOs.

- 2.2 Define and implement new regulations for MEPS and label classifications of selected energy consuming products.  
During the entire execution of this activity, the consultation of the MEPS National Committee will be implemented.
- 2.2.1 Preparatory work to define Minimum Energy Performance Standards for selected products.
- Quick technical and market assessment of the most used appliances in the country to propose, if necessary, a different set of products for the MEPS framework;
  - Identify possible synergies with regional programs, such as EELA implemented by SACREEE and EACREEE in SADC and EAC respectively;
  - Assessment of MEPS already entered into force in developed countries, neighbouring countries and Regional programs on Standards (African Union/East Africa and SADC);
  - Assessment local manufacturing production of the selected products; in particular, technological, and financial resources and the time needed for updating local production lines to be in line with standards already introduced in other countries should be duly taken into consideration;
- 2.2.2 Propose Minimum Energy Performance Standards based on preparatory work
- Review all activities performed during preparatory work;
  - Based on findings of previous point, definition of a set of minimum energy efficiency requirements for the selected products;
  - Financial and technical assessment on the opportunity of increasing minimum energy performance requirements over time;
  - Proposal of a clear time path for the implementation of the MEPS system (testing laboratory, monitoring and control system, updating local production lines, etc.);
  - Assessment of possible incentives/tax credit for local manufacturers (in particular to go further the standards) to guarantee product affordability;
  - Definition of voluntary and mandatory measures;
  - Consultation with the stakeholders.
- 2.2.3 Identify label energy efficiency classification and format
- Define label energy efficiency classification;
  - Identify label format depending on: information to be provided, language needs, labels already in use in neighbouring countries and regional labelling standards, level of education of population
  - Support the adoption and enactment of a national Energy Efficiency labelling system if applicable and/or the acceptance of existing labels in imported products and appliances if applicable.
- 2.2.4 Define processes and procedures to monitor, revise and update MEPS regulation
- Develop a periodic market study on the performances of the products available in the market;
- 2.2.5 Design and adopt policy framework and realization of a final consultative workshop
- Design the MEPS and Labelling Regulatory Framework;
  - Identify incentives, financial and fiscal supportive framework in favour of local manufacturers and end users;
  - Organize a national and public workshop to present and discuss MEPS policy framework and labelling proposed and next activities of Action 2;



<p>2.3 Define the testing procedures at TBS for new selected energy consuming products and provide technical advice for the procurement of new testing facilities at TBS.</p> <p>2.3.1 Define new testing procedures</p> <ul style="list-style-type: none"> <li>– Assessment of testing procedures used at international level for the selected products;</li> <li>– Identification of local climate conditions that could affect testing procedures;</li> <li>– Assessment of current TBS testing facilities, consultation with TBS expert and identification of the most efficient solution for the arrangement of new and old equipment;</li> <li>– Depending on the testing procedure chosen, identification of the technical equipment (instruments, software, hardware, vehicles, etc.) needed;</li> <li>– Identification of personnel (number of technicians and their expertise and skills needed) to implement testing activities of the five selected products;</li> <li>– Assessment of current technical equipment used in TBS laboratory (for example for safety tests of the five selected products) and what could be used also for energy efficiency testing;</li> <li>– Based on previous points, identification of new spaces (offices and laboratories) needed.</li> </ul> <p>2.3.2 Procurement of new testing equipment</p> <ul style="list-style-type: none"> <li>– Assessment of equipment available in the market;</li> <li>– Identification of best solution in terms of available budget, time of delivery, user-friendliness, etc.</li> </ul>
<p>2.4 Development of new testing capabilities of TBS, MOE, TIRDO, DIT and Ministry of Industry and Trade personnel.</p> <p>2.4.1 Select and need assessment of the TBS, MOE, TIRDO, DIT, and Ministry of Industry and Trade personnel;</p> <p>2.4.2 Design capacity building activities;</p> <p>2.4.3 Develop support materials for capacity building;</p> <p>2.4.4 Implement capacity building activities.</p>
<p>2.5 Develop and implement verification and enforcement systems.</p> <p>2.5.1 Definition of processes and procedures for the verification and enforcement system</p> <ul style="list-style-type: none"> <li>- Definition of the verification procedure for local and imported products (generally there are three levels: visual check, documentation check, laboratory check);</li> <li>- Identification of the national bodies that should be involved in the verification and enforcement system (custom police, TRA, etc.) and relative tasks;</li> <li>- Sanctions and penalties (based on international procedures).</li> </ul> <p>2.5.2 Capacity building for custom police and TRA personnel to perform the inspections</p> <ul style="list-style-type: none"> <li>- Assessment of current capacity and knowledge of the personnel;</li> <li>- Classroom activity concerning MEPS and label classification;</li> <li>- On-the-job training activity for the implementation of the task required.</li> </ul>
<p>2.6 Design and adopt of a policy support and framework: regulatory, financial, fiscal supportive framework and incentives.</p> <p>2.6.1 Define methodologies and procedures to monitor the implementation of the MEPS framework;</p> <p>2.6.2 Design and implement methodology and procedures to measure the savings;</p> <p>2.6.3 Identify suitable indicators.</p> <p>2.6.4 Design, propose and adopt of a policy support and Framework.</p>
<p>2.7 Learning and replication, including technical advice for the procurement of possible new testing facilities and implementation of capacity building activities.</p> <p>2.7.1 Analysis of MEPS scheme implementation, identification of best practices and market assessment to identify further energy consuming products and appliances to be covered by MEPS scheme;</p> <p>2.7.2 MEPS scheme implementation for new products and appliances throughout a consultative process;</p> <p>2.7.3 Organization of the consultative workshop;</p> <p>2.7.4 Technical advice for the procurement of new equipment for new facilities laboratory and implementation of capacity building activities.</p>

2.8	Develop and implement monitoring, verification, and enforcement scheme
2.8.1	Analysis of MEPS scheme implementation;
2.8.2	Elaboration of monitoring, verification, and enforcement scheme;
2.8.3	Organization of the consultative workshop;
2.8.4	Finalize and adopt monitoring, verification, and enforcement scheme.
2.9	Full-time National Expert
2.9.1	Hire one full time national expert in testing facilities embedded within TBS structure
2.10	Procurement of hardware, software, and office furniture for TBS establishing testing laboratories for common categories of appliance technologies

#### **Implementation approach and results:**

- Ministry of Energy and Tanzania Bureau of Standards (TBS) will be the main implementing agencies of this Action.
- MoE will develop policy measures in collaboration with involved stakeholders; with this aim, a MEPS National Committee will be created for an ongoing consultation of all stakeholders involved: MOE, TBS, Ministry of Industry, EWURA, TANESCO, TRA, companies performing Pre-shipment Verification of Conformity, regional programs, representatives of local manufacturers, importers, distributors, and retailers, etc.
- The activities of the MEPS National Committee will be coordinated by the MoE; this Committee will act as a “consultative and technical Committee” concerning policy support and framework, new MEPS regulations, label classification, testing procedures.
- The MoE will validate and coordinate the delivery of new regulations, reforms, and legislations (e.g., MEPS regulation and legislation) developed in the framework of the Action.
- The MoE will coordinate all consultative meetings, workshops and committees involving the stakeholders.
- Concerning the realization of new testing facilities at TBS, MoE, TIRDO, DIT, and Ministry of Industry and Trade the following factors will be taken into consideration:
  - The realization of testing facilities for all selected products can be costly and demand a relevant share of available budget for the entire Energy Efficiency Action Plan Implementation. The following are estimates from “Global Appliance Testing-Costs Catalogue” of SEAD (Super-Efficient Equipment and Appliance Deployment Initiative, 2019) for the capital cost needed for establishing testing laboratories for common categories of appliance technologies (in USD):
    - ACs: USD 363,000-665,000.
    - General Service Lighting: USD 74,000-615,000.
    - Refrigerators: USD 265,000-617,000.
    - Motors: USD 194,000-388,000.

One possibility could be not to implement testing facilities for all selected products, but just for some of them; for example: one product that is used for industry (such as electric motors) and one used in the household sector (such as lighting services);

- A quick market and technical scrutiny on all selected products will be carried out, as the market study that served as a basis for the selection was performed almost ten years ago (market and technical changes happened in the meantime should be taken into consideration for a new product selection);
- The procurement of new equipment will help TBS in improving and rationalizing its laboratory facilities. Before the procurement of the new testing facilities, it will be necessary to:
  - Establish minimum square meters needed for the realization of the new testing facilities and define most efficient solutions, taking into consideration current and new equipment arrangements;
  - Assess current technical equipment in use at TBS to avoid any duplication (in particular for the lighting testing laboratory).

- The selection of products for testing will be finalized early to allow ample time to procurement, shipping, and installations. The testing of facilities will be performed later during the Project implementation.
- For the Capacity Building Activity (activity 4) distant and internet learning could also be taken into consideration.
- Technical and scientific connections and links between TBS and international testing laboratories with consolidated experience in energy efficiency will be also created (in synergies with the Study Tours of Action 7).
- To perform the cost estimates of the equipment, the list (with cost estimates) of equipment needed for the testing procedure based on the standards in use in the EU for the following products will be developed during the Inception phase in collaboration with TBS:
  - Air conditioners: ISO 5151
  - General service Lighting: IEC 60969 - IEC 62612
  - Motors: IEEE 112 - IEC 60034-2
  - Domestic refrigerators: IEC 62552-3:2015
  - Professional refrigerators: PR EN 16825

## **Resources required to achieve the expected results**

### **Human resources**

- 1) Short-term International Expert(s): 167 WD
- 2) Short-term National Expert(s): 115 WD
- 3) National Expert in testing facilities (full time for three years: 783 WD) embedded within TBS structure with following tasks:
  - Organize and prepare the activities of the MEPS National Committee.
  - Supervise new testing facilities procurement, shipping, and installation.
  - Identify possible synergies with regional programs, such as EELA in SADC and EAC.
  - Perform testing activities of the selected products.
  - Report periodically to the MEPS National Committee on the tests realized.
  - Propose recommendations for the “Learning and replication” activity.

### **Equipment procurement**

- The procurement of new testing equipment is based on the selected energy-consuming products and MEPS scheme adopted. Data from “Global Appliance Testing-Costs Catalogue” of SEAD (Super-Efficient Equipment and Appliance Deployment Initiative, 2019) are used to perform estimates of the capital cost needed for establishing testing laboratories for the selected products.
- Based on the results of the “Learning and replication” activity, the Action shall be replicated to a larger population of products/appliances for achieving more energy and cost savings. Further financial resources are considered in cost estimates for the procurement of new testing facilities.
- During the inception phase, further equipment needs for TBS MOE, TIRDO, DIT, and Ministry of Industry and Trade personnel; (in particular software, hardware, and office furniture) will be assessed and the supply procurement possibly made).

### **Public information**

- Organization and realization of Capacity Building Activities.

## **Action 3: Implementation of a framework for energy performance certification in large buildings**

### **Activities:**

- 3.1 Develop and mainstream a regulatory framework for energy efficiency of large buildings into existing regulation, including formulation of Energy Efficient Building Codes (EEBC) and Energy Performance Certification (EPC) scheme
- 3.1.1 Review and assess the Deliverables of the EU TAF assignment “Preparation of Energy Performance Certification of Larger Buildings in Tanzania”;
- 3.1.2 Define an Energy Efficient Building Codes (EEBC) framework;
- 3.1.3 Define methodology and procedures to be used for the Certification of large buildings:
- Identify and make available to Building Certifiers a software for consumption appraisal;
  - Define building Energy Performance Certificate template;
  - In consultation with EWURA, PO-RALG and DIT, define methodologies and procedures for the Certification of energy specialists: skills, experience, level of education, training, examination procedures, etc.;
- 3.1.4 Develop the regulatory framework for EEBC and EPC;
- 3.1.5 Organize stakeholders’ consultative workshops: MOE, PO-RALG, DIT, TIRDO, EWURA, TANESCO, representatives of the construction industry, representatives of professionals involved in the construction sector, etc.;
- 3.1.6 Validate and adopt the EEBC and EPC framework;
- 3.1.7 Validate the regulatory framework and mainstream it into existing regulation;
- 3.1.8 Design and develop a public web page for a quick search of Building Certifiers available in the country.

3.2 Design, organize and implement gender-responsive Capacity Building training activities for: PO-RALG selected officials; Officials of selected LGAs; Officials of MOE, EWURA and TANESCO; designers, architects, engineers, and high-level institutions of learning.

- 3.2.1 Plan, organize and conduct specific training on EEBC and EPC for designers, architects and engineers involved in building construction (several training sessions in three years):
- Design the Capacity Building Activity:
    - Definition of training contents;
    - Designing and realizing technical manuals (in English and Swahili);
    - Designing “On the job training” activities;
    - Identify international best practices to be described during the Activity;
  - Implementation of the Capacity Building Activity:
    - Classroom lessons;
    - “On the job Training”.
- 3.2.2 Assessment of level of knowledge and capacities on energy efficiency in buildings of PO-RALG staff, national government Officials and local government Officials of selected cities (the assessment could be performed face to face in Dodoma and remotely via internet);
- 3.2.3 Design, organize and conduct capacity building activities for PO-RALG staff, national government Officials (MOE, EWURA and TANESCO) and local government Officials of selected cities (at least twice in three years) (PO-RALG and national/local government Officials should be able to understand the technical contents and information of the delivered Certificates):
- Designing the training:
    - Definition of training contents based on certification procedures and characteristics;
    - Designing and realizing technical manuals (in English and Swahili);
    - Designing “On the job training” activities;
  - Implementation of the Capacity Building Activity
    - Classroom lessons;
    - Visit during a building inspection for Certification;
    - “On the job Training”.

3.3	Realize EPC for large buildings pilot Projects in selected cities.
3.3.1	Identify and select cities for the implementation of the pilot Project;
3.3.2	Plan, organise and implement capacity building activities for local Officials of selected cities;
3.3.3	Organise and implement pilot Projects;
3.3.4	Analyse the results of pilot Projects and modify accordingly procedures and methodologies;
3.3.5	Define the process to extend the activity to other cities.
3.4	Monitoring and evaluation
3.4.1	Organization of stakeholders' consultative workshops where to discuss challenges and strong elements of the EEBC and EPC (at least two in three years);
3.4.2	Analysis of the results of the stakeholders' consultative meetings/workshops and implementation into new regulatory frameworks (activity to be performed once a year).
3.5	Technical advice for the procurement of equipment
3.5.1	Technical advice for the procurement of equipment (hardware and software) for PO-RALG needed for the realization of the Certificates and building certifiers database.
3.6	National full-time expert embedded within PO-RALG
3.6.1	Hire one national full-time expert embedded within PO-RALG
3.7	Hardware, software, and office furniture for PO-RALG
3.7.1	Procurement of hardware, software and office furniture for PO-RALG

#### Implementation approach and results:

- The **President's Office-Regional Government and Local Authorities (PO-RALG)** in collaboration with EWURA will be the main Implementing Agency for the implementation of this Action.
- The MOE will coordinate all consultative meetings, workshops and committees involving the stakeholders.
- Tools, regulation, requirements, methodology and procedures elaborated and recommended by the EU Technical Assistance Facility for the SE4ALL-Sustainable Energy for All Initiative (East and Southern Africa) "Preparation of Energy Performance Certification of Larger Building in Tanzania" will be reviewed, assessed, validated and eventually adopted through a consultative approach with all stakeholders involved (MOE, PO-RALG, DIT, TIRDO, EWURA, TANESCO, representatives of the construction industry, representatives of professionals involved in the construction sector, etc.); consultative workshops will be consequently organized. This activity will promote the participation of women professionals representing at least 50% of all beneficiaries.
- The MOE will coordinate and validate the delivery of new regulations, reforms, and legislations (e.g., regulations and legislations on Energy Performance Certification and Energy Building Codes of large buildings) developed in the framework of the Action.
- A periodic review of EEBC and EPC regulatory frameworks will be realized through a consultative approach with all stakeholders involved.
- PO-RALG will have following functions regarding the EPC scheme, among others: detailed scrutiny of a sample of the Certificates delivered; monitor the correct implementation of the EPC framework in the country; technical support to local Officials in the process of permission to build (in particular for Energy Efficiency Building Codes).
- EPC Certification will be delivered by Building Certifiers, certified energy specialists duly trained to perform the appraisal of the building energy consumption. EWURA, DIT and TIRDO will be the institutions in charge of training and examination of energy specialists to become Building Certifiers, at least 50% of the trained specialists will be women.
- The action will be implemented first in two medium size towns as pilot Projects. The Action will be later extended to Dar es Salaam and to the entire country, taking into consideration the results and lessons learned of the pilot Projects.

- Awareness raising campaigns concerning energy efficiency in large buildings will be organized in the framework of Action 7 (“Awareness raising”).
- Building Certifiers will use an online user interface to enter the Certificate in a database stored at PO-RALG headquarters with software already in use .

New hardware (e.g., server for databases) will be necessary for the implementation of this online procedure; as the equipment needed will depend on several factors (e.g., final decision on the online procedure to implement, quantity of data to be stored, number of certificates delivered, technical characteristics of the Certificates delivered), the number and technical characteristics of the server will be defined by a further assessment/TA.

Capacity Building Activities will be organised for:

- PO-RALG selected officials; thanks to the Capacity Building, they should be able to understand technical contents of the delivered Certificates and assist City Councils Officials in their future EPC tasks concerning building permits;
- Officials of selected City Councils; thanks to the Capacity Building, they should be able to grant building permission if EEBC and EPC requirements are satisfied;
- Officials of MOE, EWURA and TANESCO concerning Energy Efficiency Building Codes, EPC scheme and new regulatory framework;
- Designers, architects, and engineers involved in building construction concerning Energy Efficiency Building Codes, EPC scheme and new regulatory framework.

A capacity building for ITC selected staff of PO-RALG is not necessary, as this Institution has already implemented Projects with the same web-based system proposed for building certificates.

## **Resources required to achieve the expected results**

### **Human resources**

- 1) Short-term International Expert(s): 200 WD
- 2) Short-term National Expert(s): 220 WD
- 3) National Expert in energy efficiency in buildings (full time for three years: 783 WD) will be embedded within PO-RALG (EPC Office) with following tasks:
  - Organize and prepare the activities of the consultative workshops with all stakeholders involved.
  - Overview the technical realization of the online user interface used by Building Certifiers to enter the Certificate in a database stored at PO-RALG headquarter.
  - Propose recommendations for the periodic review of the EEBC and EPC regulatory frameworks.
  - Monitor and valuate the correct implementation of the EPC framework in the country.
  - Organize and supervise the technical support to local Officials in the permission process for new buildings.

### **Equipment procurement**

- During project implementation, equipment needs for PO-RALG (in particular software, hardware, and office furniture) will be assessed and the supply procurement possibly made.

### **Public information**

- Organization and realization of trainings and Capacity Building Activities;

## **Action 4: Enhance Energy Consumption Data of Large Energy Consumers**

This action will be implemented in close coordination with Expertise France, which will be separately contracted by the EU to implement a complementary assignment in the framework of the Financing Agreement 040-387 “Energy Sector Reform <sup>2</sup>”

**Activities:**

4.1	Plan, develop and implement an online bottom-up energy data collection system of raw statistical information. The following activities will be implemented by short-term international and national experts and IT staff of NBS and EWURA in the form of “On the Job Training”.
4.1.1	Assess current level of skills and capacities of the IT staff at NBS;
4.1.2	Design and implement suitable classroom training on software and hardware that will be used to implement the activity;
4.1.3	Identify all energy and non-energy data of large energy consumers to be collected for suitable data analysis (it is proposed to fill the data every three months);
4.1.4	Design and develop suitable data collection tools, methodologies, and protocols for collecting energy data consumption
4.1.5	Look for synergies with other questionnaires already submitted to large companies;
4.1.6	Design system architecture and define system requirements specifications for the online data collection from large consumers: software, hardware, database structure, data entry form, data presentation and network infrastructure;
4.1.7	Develop the online tool for data collection from large energy consumers;
4.1.8	Realize and set up the database for data collection on a server at NBS headquarters;
4.1.9	Develop a manual for training purpose of IT staff in NBS (in particular for future implementation of new functionalities of the system);
4.1.10	Test and, if necessary, modify the entire system.
4.2	Technical advice for the procurement of equipment (hardware and software)
4.2.1	Software for the realization of the web tool;
4.2.2	Software for database realization;
4.2.3	Server for database at NBS.

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<sup>2</sup> Name of the project: “Energy statistics in Tanzania, Reinforced energy sector knowledge and analysis by stakeholders, including private investors, academia and civil society organizations (gender sensitive)”.

- 4.3 Establish an energy efficiency information system (internet and paper publications) for professionals, the general public and decision makers concerning large energy consumers.
- 4.3.1 Design and implement a capacity building activity for selected MOE, EWURA, TANESCO and NBS personnel on reporting energy data
- Definition of contents of the training;
  - Realization of manuals;
  - Analysis of international standard reports;
  - Production of tables and graphs.
- 4.3.2 Technical realization of a specific website on EE statistics on the energy consumption of large energy consumers:
- Define contents and select data and information to include;
  - Define document technical design (format, graphical design, etc.);
  - Realize texts and figures;
  - Final realization and publication.
- 4.3.3 Realization of three (once a year) EE brochures for the general public (PDF and printing) on the energy consumption of large energy consumers.
- Define contents and select data and information to include;
  - Define brochure technical design (format, graphical design, number of pages, etc.);
  - Realize texts and figures;
  - Final realization (paper and internet);
  - Expenses for paper distribution and publication.
  - Realize technical document for professionals.
  - Define contents and select data and information to include;
  - Define document technical design (format, graphical design, number of pages, etc.);
  - Realize texts and figures;
  - Final realization (paper and internet);
  - Expenses for paper distribution and publication.
- 4.3.4 Realization of three (once a year) technical documents on EE data for decision makers (PDF and printing) on the energy consumption of large energy consumers.
- Define contents and select data and information to include;
  - Define document technical design (format, graphical design, number of pages, etc.);
  - Realize texts and figures;
  - Final realization (paper and internet);
  - Expenses for paper distribution and publication.
- 4.3.5 Realization of (once a year) annual reports on the energy consumption of large energy consumers.
- Define contents and select data and information to include;
  - Define document technical design (format, graphical design, etc.);
  - Realize texts and figures;
  - Final realization (paper and internet);
  - Expenses for paper distribution and publication.



4.4	Design and implement an information plan and phone/email support to familiarize respondents with their task.
4.4.1	Design a coordinated strategy and implement the information plan. <ul style="list-style-type: none"> <li>– Inform large energy consumers on their duty to enter energy data through the online tool;</li> <li>– Design and implement an online and phone web tutorial for explaining how to correctly fill the online questionnaire;</li> <li>– Develop a manual (in English and Swahili) for explaining to large energy personnel how to correctly enter the data in the web tool.</li> </ul>
4.4.2	Design and implement an online and phone support for entering online the energy data. <ul style="list-style-type: none"> <li>– Training of personnel in charge of this task;</li> <li>– Implement online and phone support.</li> </ul>
4.5	National expert part-time embedded within NBS
4.5.1	Hire one national expert part-time embedded within NBS
4.6	Hardware, software and office furniture for NBS
4.6.	Procurement of hardware, software, and office furniture for NBS

#### Implementation approach and results:

- **The National Bureau of Statistics (NBS)** in collaboration with **EWURA** will be the main implementing Agencies
- for this Action.
- MOE will coordinate the implementation including engagement of key stakeholders such as TANESCO, EWURA, REA, TPDC, etc.
- Action 4 will focus on energy consumption of large energy consumers (see Action 5 for the definition of large energy consumers); an initial threshold of 100 employees from NBS and other companies will be trained on energy efficiency data and statistics; at least 50% of them will be women.
- The ITC tasks of point a) will be implemented by NBS and EWURA ITC teams with the support of international and/or national experts in the form of a “On the Job Training” Capacity Building Activity.
- NBS ITC team will realize a web-based system business logic that will be used by large energy consumers (thanks to an online user interface) to enter data energy into a dedicated database set up on a server at NBS.
- The set of raw data collected will allow the production of standardized technical reports as defined by international organizations. A suitable survey questionnaire for collecting energy data consumption will be also developed.
- Following publications will be realized:
  - Annual technical reports for energy professionals on energy consumption of large energy consumers.
  - Annual technical documents on EE data for decision makers on energy consumption of large energy consumers.
  - Annual brochures for the general public on energy consumption of large energy consumers.
- All activities will be designed with the aim to be part of the future National Energy Balance of the country.
- Following equipment will be procured:
  - Software for the realization of the web tool;
  - Software for database realization;
  - Server for database at NBS;
  - Computers for software realization.
- The procurement of previous equipment will be performed after following activities:
  - Design of system architecture for the online data collection from large consumers;
  - Definition of system requirements specifications.

## Resources required to achieve the expected results

### Human resources

- 1) Short-term International Expert(s): 227 WD
- 2) Short-term National Expert(s): 265 WD
- 3) One long-term National Expert in awareness raising (part-time: 392 WD in total in three years) will be embedded within NBS with following tasks:
  - Phone/email support to large energy consumers' personnel in filling the online questionnaire with their energy data.
  - Elaborate the online manual for explaining to large energy consumers' personnel how to fill the online questionnaire.
  - Supervise the report realization on energy consumption of large energy consumers: technical reports for energy professionals, documents for decision makers and brochures for the general public.

### Equipment procurement

- During project implementation, equipment needs for NBS (in particular software, hardware and office furniture) will be assessed and the supply procurement possibly made.

### Public information

Printing and translation (English to Swahili) of:

- Manual for supporting large energy consumers in filling the online questionnaire.
- Translation of the online questionnaire.
- Annual technical reports on energy consumption of large energy consumers.
- Annual technical documents on EE data for decision makers on energy consumption of large energy consumers.
- Annual brochures for the general public on energy consumption of large energy consumers.

## Action 5: Development and implementation of a framework for management of large energy consumers

### Activities:

- |       |  |
|-------|--|
| 5.1   | Develop the methodology and a set of quantitative and qualitative criteria to identify, classify and notify large energy consumers   |
| 5.1.1 | Define the criteria (quantitative and qualitative) to use for identifying large energy consumers <ul style="list-style-type: none"><li>– Review of the definition of large energy consumers and methodology used in other countries with similar energy consumption pattern;</li><li>– Organize meetings with key stakeholders (Ministry of Industry, TANESCO, MOE, NBS, local governments, associations of industries, etc.) for a consultative process;</li><li>– Final agreement on the criteria to be used.</li></ul>  |
| 5.1.2 | Identify, classify, and notify large energy consumers <ul style="list-style-type: none"><li>– Define a procedure to identify large energy consumers based on the agreed criteria;</li><li>– Notify on the MOE and EWURA websites of the large energy consumers, with suitable classification (general classification, public, private, self-consumers, electricity/heating, connected or not connected to the main national grid, etc.);</li><li>– Identify of methodologies and procedures to inform companies that fall into the classification of large energy consumers.</li></ul> |

5.2	Define and mainstream in the legislation duties, responsibilities, and obligations for large energy consumers
5.2.1	Assess energy management practices of large energy consumers <ul style="list-style-type: none"> <li>– Review energy audits already performed in large energy consumers facilities;</li> <li>– Realize new energy audits in a representative sample of large energy consumers facilities;</li> <li>– Prepare and send by email a questionnaire to all large energy consumers concerning the staff personnel in charge of energy management (number of people involved in energy management, level of education, training delivered to them, full time/part-time, number of years of experience, etc.);</li> <li>– Analyse and report the answers to the questionnaire received;</li> <li>– Identify best practices and wrong conducts in energy management and their financial implications;</li> <li>– Identify areas of improvement in energy management.</li> </ul>
5.2.2	Identification of possible duties, responsibilities, and obligations to tackle wrong conducts and enhance area of improvement in large energy consumers <ul style="list-style-type: none"> <li>– Review duties, responsibilities and obligations in force in other countries (developed and in development);</li> <li>– Based on wrong conducts and best practices identified in previous activities, propose a set of duties, responsibilities and obligations in terms of activities to implement (i.e., energy audit), personnel (i.e., energy manager) and targets (i.e., “Energy Efficiency Actions Plan”);</li> <li>– Propose a further set of duties, responsibilities, and obligations for public large energy consumers, also for the implementation and dissemination of best practices.</li> </ul>
5.2.3	Selection and agreement on duties, responsibilities and obligations for large energy consumers and adopt a policy framework <ul style="list-style-type: none"> <li>– Design the duties and responsibilities Regulatory Framework;</li> <li>– Identify incentives, financial and fiscal supportive framework in favour of large energy consumers;</li> <li>– Organize a consultative meeting/workshop with all stakeholders involved: MOE, representatives of large energy consumers group, Ministry of Industry, TIRDO, TANESCO, TPSF, CTI, EWURA, Chamber of commerce industry and agriculture, etc.</li> <li>– Final agreement on duties, responsibilities, and obligations.</li> <li>– Final adoption of the policy framework</li> </ul>
5.2.4	Assess and prepare legislative requirements to support the implementation
5.3	Identify and recommend energy management and energy efficiency measures for public institutions and utilities
5.3.1	Analyse energy-mix in supply and demand sides
5.3.2	Identify and recommend suitable measures in supply side of utilities
5.3.3	Identify and recommend suitable energy efficiency measures in demand side of public institutions and utilities

5.4	Design, develop and implement capacity building activities for selected personnel of large energy consumers
5.4.1	Design and implement capacity building activities for selected personnel of large energy consumers;
5.4.2	Elaborate manuals (in English and Swahili) for the capacity building activity;
5.4.3	Contact large energy consumers to invite them to the capacity building activity;
5.4.4	Organize and realize classroom lessons for selected personnel of large energy consumers: <ul style="list-style-type: none"> <li>– basic information on energy efficiency in the industry;</li> <li>– main wrong conducts in energy management;</li> <li>– best practices;</li> <li>– energy efficient equipment and products available in the market for industries;</li> <li>– how to read and understand an energy audit;</li> </ul>
5.4.5	Organize and realize “On the job training” for the personnel that are/will be in charge of energy management on “how to work as energy manager”;
5.4.6	Organize and realize “On the job training” for the elaboration of the Energy Efficiency Action Plan of the large consumers;
5.4.7	Field visits and realization of energy audits in large energy consumers’ facilities.
5.5	Technical advice for the procurement of new laboratory equipment for TIRDO to implement the Capacity Building Activities, development of equipment use capabilities and enhancement of training capabilities and energy audits of TIRDO personnel.
5.5.1a	Technical advice and procurement of equipment;
5.5.1b	Renovation of TIRDO building: Minor repairs, painting; lighting; reinforcing room safety with proper doors and grills; air conditioning; these renovation works (in particular new air conditioning and lighting systems) will be implemented taking into consideration energy efficiency solutions to become a small best practice demonstration building.
5.5.1.c	Procurement of training consumable materials.
5.5.1.d	One vehicle 4WD
5.5.1.e	Purchase of manuals, standards and software
5.5.2	Design training and capacity building activities for TIRDO personnel to increase their capabilities in using new equipment
5.5.3	Organise and implement training and capacity building activities for TIRDO personnel to increase the capabilities in using new equipment, conducting trainings, and performing energy audits.
5.6	Develop and implement Monitoring and Verification Scheme
5.6.1	Identify the national bodies that will implement the verification and enforcement systems (MOE and/or Ministry of Industry) and related tasks;
5.6.2	Define procedures and methodologies to verify Action implementation;
5.6.3	Propose and adopt sanctions and penalties (based on international procedures);
5.6.4	Implement verifications in a sample of the large energy consumers involved in this Action.
5.7	Full-time national expert embedded within EWURA
5.7.1	Hire one full-time national expert embedded within EWURA
5.8	Hardware, software and office furniture for EWURA
5.8.1	Procurement of hardware, software and office furniture for EWURA

#### Implementation approach and results:

- **Tanzania Industrial Research Development Organization (TIRDO)** (for the capacity building activities) and **Energy and Water Utilities Regulatory Authority (EWURA)** (for identifying, classifying, and notifying large energy consumers) will be the main implementing Agencies for this Action.
- The MOE will coordinate all consultative meetings, workshops and committees involving the stakeholders.

- Regulations and legislations concerning duties, responsibilities, and obligations of large energy consumers will be defined, validated, and eventually adopted through a consultative approach with all stakeholders involved (MOE, EWURA, DIT, TIRDO, TANESCO, representatives of the large energy consumers, etc.); consultative meetings and workshops will be consequently organized.
- The MOE will coordinate and validate the delivery of new regulations, reforms, and legislations (e.g., duties, responsibilities, and obligations of large energy consumers) developed in the framework of the Action.
- The Electricity Act (under review) has empowered EWURA to be responsible for collecting data/information of large energy consumers. Should the Act become effective during Energy Efficiency Action Plan implementation, Action 5 should be aligned with this new policy development. The MOE should also have access to the database of the large consumers (linked to EWURA).
- For the definition of large energy consumers, a set of quantitative and qualitative criteria will be used. For example:
  - High yearly energy costs.
  - Energy intensive activities.
  - High impact on the electricity grid at local level because of industry activities.
  - Number of employees.
  - Substantial and inefficient use of biomass for the production lines.
- To implement energy management measures and energy efficiency interventions in the industry, duties and responsibilities for large energy consumers will be introduced, such as the realization of Energy Audits and employment of Energy Managers.
- To define duties, responsibilities and obligations, a detailed assessment of the energy management practices of large energy consumers will be also performed, among others:
  - Review energy audits already performed in large energy consumers facilities.
  - Realize new energy audits in a representative sample of large energy consumers facilities.
  - Prepare and send by email a questionnaire to all large energy consumers concerning the staff personnel in charge of energy management (number of people involved in energy management, level of education, training delivered to them, full time/part-time, number of years of experience, etc.).
  - Analyse and report the answers to the questionnaire received.
  - Identify best practices and wrong conducts in energy management and their financial implications.
  - Identify areas of improvement in energy management.
- Through suitable Capacity Building activities, TIRDO personnel will be able to design, develop and conduct trainings for selected personnel of large energy consumers; the trainings conducted by TIRDO personnel will cover following topics:
  - Basic information on energy efficiency.
  - Good and wrong conducts in energy management.
  - Best practices.
  - Energy efficient equipment and products available in the market for industries.
  - How to read and understand an energy audit.
  - How to be a good energy manager and improve energy management in your factory (activity delivered in the form of “on the job training”).
  - Support for the elaboration of specific “Energy Efficiency Action Plan” of the large consumers facilities (activity delivered in the form of “on the job training”).
  - How to report periodically on implemented energy saving measures to relevant authorities.
- A report activity on energy consumption of large energy consumers will be implemented in the framework of Action 4 (“Enhance energy consumption data of large energy consumers”).
- Awareness raising campaigns concerning energy efficiency for large energy consumers will be organized in the framework of Action 7 (“Awareness raising”).

- TIRDO will also be involved in conducting hands-on and practical trainings concerning energy audits for Energy Managers, Energy Auditors and Building Certifiers, in the framework of Action 6 (“Qualifications and Skills”). These trainings will promote a higher participation of women and engagement of relevant institutions of higher education. At least 50% of the beneficiaries will be women.
- This Action will be connected to the implementation of following Actions:
  - Action 2 (MEPS): introduction of MEPS for equipment in use in large companies (i.e., electric motors);
  - Action 4 (Energy data): energy data collection, processing, analysis of large energy consumers;
  - Action 6 (Qualifications and Skills): trainings for Energy Auditors and Energy Managers;
  - Action 7 (Awareness Raising): organization of awareness raising campaigns for the management of large energy consumers.

## **Resources required to achieve the expected results**

### **Human resources**

- 1) Short-term International Expert(s): 205 WD
- 2) Short-term National Expert(s): 175 WD
- 3) One full-time National Expert in energy efficiency will be embedded within TIRDO (for three years: 783 WD) with following tasks:
  - Organize and prepare the activities of the consultative workshops with all stakeholders involved.
  - Supervise new equipment procurement, shipping and installation.
  - Liaise with EWURA.
  - Organize and supervise capacity building activities for selected personnel of large energy consumers.
  - Organize and assist the logistics of the trainings for the certification of Energy Managers, Energy Auditors and Building Certifiers (see Action 6).

### **Equipment procurement**

- Procurement of new equipment (technical instruments, software, and vehicle) for TIRDO to implement capacity building activities for large energy consumer companies’ staff; the procurement of the equipment for the TIRDO laboratory should be performed after the syllabus for the trainings for certification is validated. One 4WD SUV will be procured to support implementation of this activity.
- During project implementation, further equipment needs for TIRDO (in particular software, hardware, and office furniture) will be assessed and the supply procurement possibly made.

### **Public information**

- Translation and printing of manuals.
- Organization and realization of the capacity building activities for selected staff of large energy consumers (including field visits).
- Renovation of TIRDO building dedicated to Capacity Building activities: minor repairs, painting; lighting; reinforcing room safety with proper doors and grills; air conditioning; these renovation works (in particular new air conditioning and lighting systems) will be implemented taking into consideration energy efficiency solutions to become a small best practice demonstration building.
- Field visits in the context of Capacity Building Activities.
- Training consumable materials: papers, pens, files, folders, flip charts, etc.
- Purchase of manuals and standards.

## **Action 6: Development of professional qualifications and skills in Energy Management and Audit**

**Activities:**

6.1	Design and support the adoption of new regulation framework for professional qualifications and certification in Energy Management and Audit, including procedures and methodologies for the certification of Energy Managers, Energy Auditors and Building Certifiers and for Energy Auditing Firms (EAF) accreditation. At least 50% of the beneficiaries will be women.
6.1.1	Assess international practices;
6.1.2	Define and recommend regulation framework: <ul style="list-style-type: none"><li>- Define experience and education requirements to be candidate as EM, EA, BC and EA firms;</li><li>- Design and adopt regulation support for professional qualifications and skills for EM, EA, BC and EA firms;</li></ul>
	a) Design and update procedures and methodologies for EM, EA, BC and EA firms examinations;
6.1.3	Organization of a consultative workshop with all stakeholders involved and support the adoption of the new regulation framework.
6.2	Support design and implementation of trainings at TIRDO and DIT for Energy Managers (EM), Energy Auditors (EA) and Building Certifiers (BC), including development of equipment use capabilities of DIT personnel and enhancement of training capabilities of DIT personnel. At least 50% of the beneficiaries will be women.
6.2.1	Assessment of international practices in terms of training and certification of EM, EA and BC;
6.2.2	Assessment of the technical instruments and capacity needs of TIRDO and DIT personnel;
6.2.3	Design, develop and implement the “Training of trainers” activity for DIT and TIRDO and enhance their capabilities in training EM, EA, and BC: <ul style="list-style-type: none"><li>- Design the train of trainers activity (contents, number of hours, methodology, etc.);</li><li>- Elaborate the support materials for the train of trainers activity;</li><li>- Certification of trainers;</li></ul>
6.2.4	Elaborate and update the syllabus and contents of trainings for EM, EA and BC (number of training hours, methodologies, number and qualifications of trainers needed, etc.);
6.2.5	Elaborate, realise and update the support materials for EM, EA and BC.
6.3	Technical advice and support to the procurement of equipment for the new Energy Efficiency laboratory at DIT.
6.3.1.a	Procurement of devices and equipment for the energy efficiency laboratory.
6.3.1.b	Purchase of manuals and standards.
6.3.1.c	Procurement of training consumable materials.
6.4	Support for setting up and maintain a register of certified EM, EA, BC and EAF and Publication of the Regulation Framework and the list of certified EM, EA, BC and EA firms on EWURA website, MOE website, Gazette of Tanzania
6.4.1	Create and maintain official certification registers and suitable procedures for update EWURA and MoE's websites and publication on the Gazette of Tanzania.
6.4.2	Procurement of associated software and hardware for the registers.
6.5	Design and implement international activities for DIT students and measures to support education of girls/women
6.5.1	Design and implement suitable measures to support energy education of girls and women: Grant scheme for girls/women will be disbursed and coordinated by the DIT. At least four groups will be the beneficiaries.
6.5.2	Design and implement regional/international p2p activities within the EAC area.
6.6	One Full-time national expert in gender equality and organization embedded within DIT
6.6.1	Recruitment of One Full-time national expert in gender equality and organization embedded within DIT
6.7	Hardware, software and office furniture for DIT
6.7.1	Procurement of hardware, software and office furniture for DIT

## Implementation approach and results:

- **DIT and TIRDO** will be the main implementing Agencies for this Action.
- The MOE will coordinate all consultative meetings, workshops and committees involving the stakeholders (as per Action 8).
- Regulations and legislations concerning professional qualifications and certification in Energy Management and Audit, including procedures and methodology for the certification of Energy Managers, Energy Auditors and Building Certifiers and for Energy Auditing Firms will be defined, validated and eventually adopted through a consultative approach with all stakeholders involved (MOE, EWURA, DIT, TIRDO, TANESCO, representatives of the energy specialists, etc.); consultative meetings and workshops will be consequently organized.
- The MOE will coordinate and validate the delivery of new regulations, reforms, and legislations (e.g., regulation framework for professional qualifications and certification in Energy Management and Audit, including procedures and methodology for the certification of Energy Managers, Energy Auditors and Building Certifiers and for Energy Auditing Firms) developed in the framework of the Action.
- DIT, as Academic Institution, and TIRDO, as Industrial Research Institution, will be in charge of designing and implementing trainings and examination procedures and methodologies for the certification of energy specialists. This action will utilize South-south cooperation and triangular cooperation opportunities to enhance cross-learning and knowledge exchange.
- The members of the examination commissions should be Officials from DIT, TIRDO, MOE, EWURA and TANESCO. At least one of the members of the examination commissions will be an energy specialist of high experience (energy auditor and/or energy manager) working in private or public sector.
- One of the criteria to be trained as Energy Manager and to be a candidate to Certification in energy management will be: holding a Master graduation.
- One of the criteria to be trained as Energy Auditor and Building Certifiers to be a candidate to Certification in energy auditing and Building Certification will be holding a diploma graduation. Women will be given special consideration through awareness raising about the training opportunity and special selection criteria. The aim is to achieve at least 50% of women beneficiaries.
- One of the criteria to be certified as energy manager, energy auditor or building certifier will be: a minimal experience of six months in a company (private or public) working on energy management (DIT students have already the opportunity to undertake a training period in companies that made a special agreement with the Institution).

## Resources required to achieve the expected results

### Human resources

- 1) Short-term International Expert(s): 100 WD
- 2) Short-term National Expert(s): 55 WD
- 3) One National Expert in Gender Equality and logistics (full time for 3 years: 783) will be embedded within DIT structure in charge of:
  - Create connections and links with EU companies and organize and implement working periods for DIT students in EU companies.
  - Identifying and implementing suitable and effective measures to support energy education of girls and women in DIT.

### New equipment procurement

- Procurement of the DIT laboratory, needed for training executions (EM, EA, and BC). The procurement of the equipment for the DIT laboratory will be performed after the validation of the syllabus for the trainings for certification.



- During project implementation, further equipment needs for DIT (in particular software, hardware, and office furniture) will be assessed and the supply procurement possibly made.

**Public information**

- Translation and printing of manuals.
- Grant scheme and activities for girls/women at DIT.
- Purchase of manuals and standards.
- Training consumable materials: papers, pens, files, folders, flip charts, etc.

**Action 7: Create Energy Efficiency Awareness of the Public**

**Activities:**

- 7.1 Design Awareness Raising Plan including conducting opinion research
- 7.1.1 Desk research
  - Tanzania literature and media review on energy efficiency;
  - Stakeholder mapping;
  - Assessment of the opinion research already conducted in the past.
- 7.1.2 Opinion research on importers, distributors and retailers of energy consuming appliances and products:
  - Define objectives of the opinion research;
  - In the case of interviews:
    - Define the topics to be covered during the interviews;
    - Elaborate a questionnaire;
    - Identify importers, distributors and retailers sample to interview;
    - Develop procedures and methodology to perform the interviews and to collect the answers (by email and face-to-face);
    - Realize the interviews;
    - Analyse the interviews performed;
    - Report the findings of the interviews realized;
    - Identify focus groups that will participate to the discussions;
  - In the case of focus groups:
    - Define the objectives of the focus group discussions;
    - Define topics to be covered during the focus groups;
    - Develop procedures and methodology to perform the focus groups;
    - Realize focus groups discussions;
    - Analyse the focus groups discussions performed;
    - Report the findings of the focus group discussions.
- 7.1.3 Opinion research on private and public companies management:
  - Define objectives of the opinion research;
  - In the case of interviews:
    - Define the topics to be covered during the interviews;
    - Elaborate a questionnaire;
    - Identify importers, distributors and retailers sample to interview;
    - Develop procedures and methodology to perform the interviews and to collect the answers (it is proposed by email and face-to-face);
    - Realize the interviews;
    - Analyse the interviews performed;
    - Report the findings of the interviews realized;
    - Identify focus groups that should participate to the discussions;
  - In the case of focus groups:
    - Define the objectives of the focus group discussions;
    - Define topics to be covered during the focus groups;
    - Develop procedures and methodology to perform the focus groups;
    - Realize focus groups discussions;
    - Analyse the focus groups discussions performed;
    - Report the findings of the focus group discussions.

- 7.2 Design, develop and implement of Capacity Building Activities for selected personnel of MOE, EWURA, TANESCO, water utilities and other implementing Agencies on how to plan and implement a successful awareness raising campaign on energy efficiency: objectives, compelling messages, optimal channels, targeted audiences, logos, timeline, budget, tone, style, etc.
- 7.2.1 Assess findings and results of the opinion research;
- 7.2.2 Classroom lessons with best practices description on how to plan, develop and implement a successful awareness raising campaign:
- Design the classroom lessons;
  - Identify suitable best practices to be described during the classroom;
  - Develop manuals (in English and Swahili);
  - Contents of the classroom lessons could cover:
    - Definition of a set of specific, achievable and measurable objectives;
    - Design of relevant, unique and repetitive messages;
    - Identification of specific target groups (households, private companies management, public institutions officials, students, etc.);
    - For each target group, identification of the most suitable media and communication tools for disseminating key messages (TV, radio, digital, printed paper, local events, etc.);
    - Definition of a timeline;
    - Assessment of the necessity to plan and realize a pilot Project to test the awareness campaign;
    - Realization of communication materials (texts, articles, video, audio, banners, etc.).

- 7.3 Design, develop and implement awareness raising campaigns on energy efficiency for: general public; private and public companies' management; government and public institutions Officials; decision makers; import companies, dealers, distributors and retailers of energy consuming products; high school and University students
- The awareness raising campaigns will be designed, developed, and implemented by the MOE in cooperation with awareness raising National Expert of the Energy Efficiency Unit; "On the job Training" activities conducted by International Experts will be performed, in particular during the design phase of the awareness campaigns.
- 7.3.1 For the general public explaining benefits and opportunities of energy efficiency and educating consumers on the importance of saving energy; special focus should be given to the involvement of women using appliances at home;
- 7.3.2 For the general public on Action number 2 to describe labelling and energy efficiency classification of the five selected products;
- 7.3.3 For the management of large energy consumers (see Action 4):
- New obligations and duties for large energy consumers concerning energy management;
  - Objective, scope and content of energy audits;
  - Tasks of Energy Managers;
  - Benefits and opportunities to purchase energy efficient equipment and appliances (workshops, leaflets, articles in industry publications, etc.);
  - Promotion women to work for an efficient energy management in private companies.
- 7.3.4 For government Officials and TANESCO, EWURA and water utilities personnel;
- 7.3.5 For national and local decision makers on energy efficiency potential and opportunities (short information briefs, workshops and meetings); special focus should be given on how right policies could foster women and girls' role in energy efficiency;
- 7.3.6 For the management of SMEs, industrial companies, large commercial buildings (hotels, office buildings, sports halls, fitness centres, etc.) and public national and local institutions to foster the procurement of energy efficient appliances and devices (workshops, leaflets, articles in industry publications, etc.);
- 7.3.7 For import-export companies, dealers, distributors, and retailers (see Action 2):
- benefits for their business to market energy efficient appliances and devices
  - energy labels classification as marketing tools;
  - how to communicate to their customers the importance of energy efficiency;
- 7.3.8 For high school and University students to encourage them to study energy efficiency related matters and start new businesses in areas relevant to energy efficiency development; this campaign should also focus on girls. In the implementation of previous awareness raising campaigns, following communication channels, tools and media will be used (when appropriate depending on targeted audience, costs, and message):
- TV and radio special programmes (both at national and local levels);
  - Social media (Facebook, Twitter, Instagram, etc.);
  - Specific web portals;
  - Blogs;
  - Documentaries for TV and the Internet;
  - TV and radio advertisings;
  - Articles and interviews on newspapers and magazines;
  - Books
  - Leaflets, flyers, brochures;
  - Billboards
  - Posters;
  - Traveling exhibitions;

	<ul style="list-style-type: none"> <li>– Movie and theatre plays;</li> <li>– Seminars, workshops and meetings;</li> <li>– Local events;</li> <li>– Involvement of celebrities.</li> </ul>
7.4	Design, develop and implement an “Advisory Service” directed at supporting large energy consumers and SMEs in implementing energy efficiency actions
7.4.1	<p>An “Advisory Service” will be created, directed at supporting large energy consumers and SMEs in:</p> <ul style="list-style-type: none"> <li>– Providing information on energy efficiency equipment and products, suitable for utilisation in industries and available in Tanzania.</li> <li>– Organizing public events where the management of large energy consumers could meet with energy efficiency specialists and engineering companies to learn about economic and industrial benefits of energy efficiency interventions.</li> <li>– Organising an annual energy efficiency conference focused on industry best practices in Tanzania.</li> <li>– Assisting local large and SME companies (including retailers and distributors of energy consuming products owned by women) in match-making energy efficiency interventions with suitable financial support from EU programs (e.g., ElectrIFI and EU External Investment Plan) and other Donors programs (e.g., SUNREF).</li> <li>– Designing and making available to companies a toolkit for a quick calculation of Pay Back Time and Internal Rate of Return of various energy efficiency measures in industry.</li> <li>– Looking for synergies and multiplier effect with similar services, e.g., the service offered by CTI to their members.</li> <li>– Developing suitable awareness raising activities for encouraging local banks and financiers in investments in energy efficiency interventions (looking for multiplier effect with SUNREF).</li> <li>– Creating a database of accredited local engineering companies and certified professionals in charge of performing energy audits and realizing energy efficiency interventions.</li> <li>– Supporting for the creation of cooperatives of importers and retailers of efficient appliances will be implemented, in particular micro-enterprises owned and managed by women in rural areas.</li> <li>– Developing a specific webpage dedicated to energy efficiency best practices in Tanzania and at international level and BAT.</li> </ul>
7.5	Design, develop and realize an “Energy Efficiency Action Plan” webpage to be embedded in line institutions: MOE, EWURA, TANESCO, REA, etc
7.5.1	Technical realization and update of the EEAP website.
7.6	Disseminate information and realize every year an “Energy Efficiency Action Plan Progress Report”
7.6.1	<p>Publication of three (once a year) of an “Energy Efficiency Action Plan Progress Report”, including the quantification of the level of energy savings:</p> <ul style="list-style-type: none"> <li>– Define contents and select data and information to be included;</li> <li>– Define the technical design of the document (format, graphical design, etc.);</li> <li>– Realize texts and figures;</li> <li>– Translate English/Swahili;</li> <li>– Final realization;</li> <li>– Expenses for distribution and publication.</li> </ul>
7.7	Organize an annual “Energy Efficiency Action Plan Conference”
7.7.1	Organization of three (one a year) annual Energy Efficiency Action Plan Conference.
7.8	Organize national and international study tours for Officials of MOE, EWURA, TANESCO, water utilities and other implementing Agencies
7.8.1	Organization of 6 study tours, 5 Officials per study tour.

7.9	One full-time National Expert in energy efficiency in charge of the "Advisory service"
7.9.1	Hire one full-time National Expert in energy efficiency in charge of the "Advisory service"
7.10	One full-time National Expert in energy efficiency Awareness raising in charge of awareness raising
7.10.1	Hire one full-time National Expert in energy efficiency awareness raising in charge of awareness Raising

### Implementation approach and results:

- Focus opinion research will be conducted on:
  - Importers, distributors and retailers of energy consuming appliances and products: to assess their level of knowledge of energy efficient product and define suitable strategies to involve them in the awareness raising campaigns for the general public;
  - Private and public sector management: to assess their level of knowledge of energy efficient products and identify main reasons (financial, technical, regulatory, etc.) why private and public sector management is not keen to invest in energy efficiency interventions.

Opinion research on general public will not be implemented as it could be costly and give limited information, as we can already assume that the general knowledge of energy efficiency is very small.

- Opinion research will also involve as many women as possible to identify main barriers and challenges to their involvement in the commercial chain (for import and distribution) and to enhance their involvement in the retailer part of the chain. In the case of the private and public sector management, it is proposed to identify as well main barriers and challenges to the involvement of women in companies' energy management and to address them in the awareness raising campaigns (for example, describing successful examples of women/girls working in the energy management in companies/industry).
- A two-stage capacity building activity will be organized for the MOE, EWURA and TANESCO personnel in charge of designing, developing, and implementing awareness raising campaigns:
  - First stage: classroom lessons on awareness raising, where several international best practices will be duly described and analysed.
  - Second stage: "On-The-Job Training" with design, development and implementation of concrete awareness raising campaigns.
- Experiences, best practices, and lessons learnt from previous awareness raising campaign on renewable energy implemented by MOE will be taken into consideration.
- A National Expert embedded within MOE structure will be in charge of designing, developing and implementing awareness raising campaigns. He/she will work in strict cooperation with the Communication and Information Units/Departments of MOE, EWURA and TANESCO.
- An "Advisory Service" will be created, directed at supporting large energy consumers and SMEs in:
  - Providing information on energy efficiency equipment and products, suitable for utilisation in industries and available in Tanzania.
  - Organizing public events where the management of large energy consumers could meet with energy efficiency specialists and engineering companies to learn about economic and industrial benefits of energy efficiency interventions.
  - Organising an annual energy efficiency conference focused on industry best practices in Tanzania.
  - Assisting local large and SME companies (including retailers and distributors of energy consuming products owned by women) in match-making energy efficiency interventions with suitable financial support from EU programs (e.g., ElectrIFI and EU External Investment Plan) and other Donors programs (e.g., SUNREF).
  - Designing and making available to companies a toolkit for a quick calculation of Pay Back Time and Internal Rate of Return of various energy efficiency measures in industry.

- Looking for synergies and multiplier effect with similar services, e.g., the service offered by CTI to their members.
- Developing suitable awareness raising activities for encouraging local banks and financiers in investments in energy efficiency interventions (looking for multiplier effect with SUNREF).
- Creating a database of accredited local engineering companies and certified professionals in charge of performing energy audits and realizing energy efficiency interventions.
- Supporting for the creation of cooperatives of importers and retailers of efficient appliances will be implemented, in particular micro-enterprises owned and managed by women in rural areas.
- Developing a specific webpage dedicated to energy efficiency best practices in Tanzania and at international level and BAT.
- Cost estimate for the awareness raising campaigns depends on several factors that can be defined only during the planning phase of the campaigns: quantity of TV and radio advertisings, number and characteristics of local events, quantity of printed materials, quantity and duration of workshop and seminars, etc. For this reason, in cost estimates of Action 7 average prices of national awareness raising campaigns are taken into account.

## **Resources required to achieve the expected results**

### **Human resources**

- 1) Short-term International Expert(s): 50WD
- 2) Short-term National Expert(s): 200 WD
- 3) One National Expert in Energy Efficiency Awareness Raising (full time for three years: 783 WD) embedded within the MOE will be, in strict cooperation with the Communication and Information Units/Departments of MOE, EWURA, TANESCO and other implementing Agencies, in charge of:
  - Supervise the realization of the opinion research.
  - Supervise the realization of the Capacity Building Activities.
  - Supervise the realization of the “Energy Efficiency Action Plan” website.
  - Supervise the realization of the “Energy Efficiency Action Plan Progress Report”.
  - Design, organize and overview the implementation of the awareness raising campaigns.
  - Design and organize the annual Energy Efficiency Action Plan conference.
  - Design and organize study tours for selected personnel of Officials of MOE, EWURA, TANESCO, water utilities and other implementing Agencies.
- 4) One National Expert in Energy Efficiency (full time for three years: 783 WD) embedded within the MOE will oversee design, organize, and implement the activities of the Advisory Service.

### **New equipment procurement**

- During project implementation, equipment needs for MOE for the implementation of Action 7 (in particular software, hardware, and office furniture) will be assessed and the supply procurement possibly made.
- Procurement for media coverage
- Translation and printing

### **Public information**

- Logistics costs for opinion research.
- Logistics costs, printing and translations for the awareness raising campaigns.
- Logistics costs for the awareness raising events organized.

**Action 8: Project Management, which include Project Coordination Unit and Project Management Unit, coordinating and facilitating the implementation of the seven Actions.**

### **Activities**

- 8.1.1 Project manager (1 international expert)
- 8.1.2 Logistics/Administration staff (1 national expert)
- 8.1.3 Two (2) 4WD vehicles for MoE
- 8.1.4 Software, hardware and office equipment for MoE
- 8.1.5a Organization of Inception workshop
- 8.1.5b Organization of Validation Workshop
- 8.1.5c Organization of workshops, meetings, conferences and events
- 8.1.5d Organization of Board meetings
- 8.1.6a Project Evaluations (Mid-Term Evaluations)
- 8.1.6b Project Evaluations (Mid-Term Evaluations)
- 8.1.7c Validation workshop for Mid-term evaluation
- 8.1.8d Project Evaluations (Terminal Evaluations)
- 8.1.8e Project Evaluations (Terminal Evaluations)
- 8.1.8f Validation workshop for Terminal evaluation
- 8.1.8a Project Office costs: Office space rent
- 8.1.8b Project Office costs: Furnishing
- 8.1.8c Project Office costs: Utilities (Electricity, Water, IT, Telecommunication)
- 8.1.8d Project Office costs: Other costs (Security, Maintenance, Repair)
- 8.1.8e Project Office costs: Consumables.

- 8.2 UNDP: Project Management Unit (PMU) - Project office
- 8.2.1 Programme Specialist
- 8.2.2 Hire Project Quality Assurance Officer
- 8.2.3 Programme Analyst
- 8.2.4 Communication Analyst
- 8.2.5 Programme Associate
- 8.2.6 Programme Finance Associate
- 8.2.7 Procurement Associate
- 8.2.8 Monitoring
- 8.2.9 Communication and ICT
- 8.2.10a Project Office costs: Furnishing
- 8.2.10b Project Office costs: Utilities (Electricity, Water, IT, Telecommunication)
- 8.2.10c Project Office costs: Other costs (Security, Maintenance, Repair)
- 8.2.10d Project Office costs: Consumables

### **Implementation approach and results:**

Staff structure of the Project Coordination Unit will be composed of:

- Project manager (1 International Expert): International Expert in energy efficiency and project management, in charge of the design, development and implementation of all Actions.
- Logistics/Administration staff (1 National Expert): National Expert in logistics and administration, in charge of supporting implementing Agencies in the logistics and administration issues.

### **Resources required to achieve the expected results**

#### **Human resources**

- Long-term International Expert: 783 WD
- Long-term National Expert: 783 WD
- Short-term international expert(s) 30WD
- Short-term national expert(s) 30 WD



### *Equipment Procurement*

Supply of equipment (hardware, software, office furniture and vehicles) to support MOE staff that will be involved in the project.

To perform cost estimates, the list of equipment (hardware and software) sent by MOE has been taken into consideration:

- office furniture.
- multimedia (printers, projector, copier machine, etc.).
- further hardware and software to be procured during Action Plan implementation.

Concerning the vehicles, in cost estimates following item has been considered:

- Two (2) 4 WD SUV vehicles

### **Public information**

The MOE will coordinate all consultative meetings, workshops and committees involving the stakeholders for all Actions. For the organization and realization of these events and other events in addition to those implemented in the context of Action 7-Awareness Raising.

## IV SUSTAINABILITY

Sustainability of the project will be ensured through the following approaches:

- *Financial:* Capacity building to be provided to the institutions involved in the implementation of the project will create systems and frameworks within the institutions that will save costs normally spent for training purposes, and costs that would be spent for procurement of various equipment including the testing tools. The long-term financial impact relates to the cost-saving as a result of a wider application of the EE practices by the public due to an improved awareness and availability of energy efficiency products in the market. Implementing institutions will have opportunities to generate revenue through provision of various activities related to EE testing, approval, EE training, EE data, and so forth, and this will ensure financial sustainability of the project beyond the project closure.
- *Institutional:* The project will develop capacity development systems that will be institutionalised into the existing training institutions to provide continued EE-based training as part of its curriculum. The implementing institutions will also benefit from improved infrastructure and facilities to be provided by the project.
- *Technical:* More skilled labour(s) and technicians will be trained through various training programs on EE. This will ensure the availability of skilled work force at affordable cost for service, operation, and testing of EE equipment and systems. The capacity development programme(s) with local training institutions such as DIT will provide a continued avenue to train and maintain the required technical skills in EE. Ensuring the quality standards of the energy products will build confidence among the end users. This will boost the market both at the household level and community.
- *Policy:* The SE4ALL project will bring-about an improved approach to energy sector activities through the formulation of various energy efficiency frameworks, including the necessary implementing rules and regulations.

In general, the sustainability of the programme is ensured through following design approaches:

### **1. Continuous review of project progress, deviations in trends and course-corrections:**

PMU and PCU will have a vigilant monitoring and evaluation system on the project implementation. Any deviations will be identified, and challenges faced will be discussed with the relevant stakeholders. Based on these discussion and review, corrective actions will be taken to keep the project implementation on track.

## **2. Capacity building to the target stakeholders:**

All the stakeholders involved in different focus sectors will be trained on their respective roles and responsibilities. Especially, the government ministries and policy makers will be trained in energy sector planning, prioritizing development projects, fund management, project management, latest technologies, public-private partnerships, etc. As most of the focus sectors come under the management of ministries, they will be better equipped to steer the projects towards successful implementation.

## **3. Creation of project ownership:**

All the projects implemented will encourage the ownership creation at each level. Each stakeholder will have a share in the successful implementation of the project towards reaching the targets. This will also improve the overall co-operation among the stakeholders.

## **V COMMUNICATION AND VISIBILITY**

To achieve the communication objectives, Ministry of Energy (MOE) will lead on all communication and visibility initiatives with close collaboration and support from UNDP. The Communication and Visibility Plan has been developed to guide all communication and visibility aspects of the project. The main objectives of the project's communication and visibility efforts are:

- To communicate messages to the general public, government, investors, academia, and other relevant stakeholders about the financial and technical support of EU (with co-funding from UNDP) to the Energy Sector and in part to the increase in Energy Efficiency in Tanzania.
- To promote the work of EU, Government, UNDP, and its partners on the Energy Efficiency Action Plan project in Tanzania.
- To communicate project and sector-specific messages to the general public, government, investors, academia, and other relevant stakeholders in order to benefit from the implementation of the project.
- To promote the energy efficiency practices, and reduction of energy loss in Tanzania.
- To showcase and demonstrate impact and good practices achieved by the project.
- To demonstrate partnership between EU, Government, UNDP, and other stakeholders.

All communication by MOE and UNDP regarding this project will carry the EU and partner logos while benefiting from the programme financing. UNDP will also communicate about the project's activities and link with global networks for a wider visibility, including the visibility of the EU support. The Communication and Visibility Plan will be implemented in line with article 8 of the General Conditions (Annex 2 of the EU-UNDP Agreement), as well as with Joint Visibility Guidelines for EC-UN actions in the field.

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**V. RESULTS FRAMEWORK**

Project title: Implementation of the Energy Efficiency Action Plan in Tanzania									
Overall Objective (Outcome): <b>increased access to affordable, reliable, sustainable, and modern energy for all in Tanzania</b>									
Outcome indicators:									
<ul style="list-style-type: none"> <li>Percentage of population accessing modern energy</li> <li>Number of large energy consumers adopting energy efficiency technologies</li> <li><b>Number of households and small energy consumers</b> adopting energy efficiency technologies</li> <li>Percentage reduction in annual energy loss</li> <li>Increased reliability of modern energy</li> <li>Increased availability of energy efficiency technologies</li> </ul>									
ACTIONS	ACTION INDICATORS3	DATA SOURCE	BASELINE		TARGETS (by frequency of data collection)				DATA COLLECTION METHODS & RISKS
			Value	Year	Year 1	Year 2	Year 3	FINAL	
<b>Action 1</b> Review and update the Energy Efficiency Action Plan and prepare the Energy Efficiency Strategy to be aligned with the Action Plan	1.1 An Energy Efficiency Strategy in place	Minutes of technical sessions, Progress reports, consultancy reports, Ministry reports	Draft Energy Efficiency Strategy in place	2021	EE Strategy developed				Validation meeting minutes and reports.
	1.2 Updated Energy Efficiency Action Plan in place	Minutes of technical sessions, Progress reports, consultancy reports, Ministry reports	Draft Energy Efficiency Action Plan in place	2017	EEAP developed				Validation meeting minutes and reports
<b>Action 2</b> Development of Minimum Energy Performance	2.1 A MEPS National Committee in place and operational	Terms of Reference, Minutes of Committee, Ministry reports.	No MEPS National Committee in place	2021	MEPS Committee established.				Minutes and deliberations of meetings of MEPS Committee.

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3 It is recommended that Projects use output indicators from the Strategic Plan IRRF, as relevant, in addition to Project-specific results indicators. Indicators should be disaggregated by sex or for other targeted groups where relevant.

Standards (MEPS) and Labelling	2.2 Number of new regulations defined and implemented.	TBS reports, Ministry of Industry and Trade reports, Ministry reports.	0	2021	1	2		3	Official Gazettement of the new regulations
	2.3 Number of testing procedures defined	Terms of Reference, Ministry reports. Consultancy reports.	0	2021	3	3		6	Minutes of meetings with selected officials at TBS to assess acceptability of the MEPS.
	2.4 Number of TBS, MOE, MIT personnel trained in new capabilities	Training reports, progress reports, workshop reports, Ministry reports. consultancy reports.	0	2021	20	20		40	Entry and exit tests and reports from trainings of selected officials at TBS to assess level of understanding of the MEPS and application of knowledge gained.
	2.5 Verification and enforcement systems in place and operational	Progress reports, workshop reports, Ministry reports.	0	2021		Verification and enforcement systems prepared.			Survey report to study the level of enforcement of verification systems.

	2.6 Number of policy support and framework adopted.	Progress reports, workshop reports, Ministry reports. consultancy reports.	No policy support and framework adopted	2021		Policy support and framework adopted			Survey report to study the level of adoption of the new policy and frameworks. Gazettement of related policies
	2.7 Number of people trained on procurement of possible new testing facilities	Training reports, progress reports, workshop reports, Ministry reports. consultancy reports.	0	2021	20	20		40	Interview with selected people trained to assess level of understanding of the procurement of testing facilities. Entry and exit tests and reports from trainings
	2.8 A monitoring, verification and enforcement scheme in place	Training reports, progress reports, workshop reports, Ministry reports. TBS reports, consultancy reports.	No monitoring, verification and enforcement scheme in place	2021	A monitoring, verification and enforcement scheme prepared.				Publication on TBS website and on media, Reports from TBS.



	2.9 Number of hardware, software, and office furniture for TBS	Ministry reports, UNDP reports, TBS reports	0	2021	5			5	Assessment report of equipment procured and their use. Delivery note, hand over report signed by beneficiary institution.
	2.10 Number of national experts in testing facilities embedded within TBS structure	Ministry reports, UNDP reports, TBS reports	0	2021	1			1	Performance assessment by UNDP and beneficiary institution of the recruited experts.
<b>Action 3:</b> Implementation of a framework for energy performance certification in large buildings	3.1 A regulatory framework for Energy Efficiency of large buildings developed and implemented.	Workshop reports, progress reports, Ministry reports, PO-RALG reports,	Absence of a regulatory framework for Energy Efficiency of large buildings.	2021	A regulatory framework for Energy Efficiency in place.				Survey to assess the level of implementation of the regulatory framework. Gazettement of regulatory framework

	3.2 Number of trainings and capacity building activities designed, organized, and implemented.	Training reports, progress reports, workshop reports, Ministry reports, PO-RALG reports, consultancy reports.	0	2021	20	20		40	Interview with selected people trained to assess level of knowledge and knowledge application. Entry and exit tests and reports from trainings
	3.3 Number of EPC large buildings pilot Projects in selected cities realized.	Progress reports, Ministry reports, PO-RALG reports, consultancy reports.	0	2021	2	2		4	Assessment of the performance of the pilot projects. EP Certificates issued.
	3.4 Number of Monitoring and evaluation workshops held.	Progress reports, workshop reports, Ministry reports, PO-RALG reports, consultancy reports.	0	2021	30	30		60	Qualitative and quantitative surveys. Evaluation reports.
	3.5 Specification for equipment for building certifiers databases in place.	Progress reports, Bid documents, Ministry reports, PO-RALG reports, consultancy reports.	No specification for equipment for building certifiers databases in place.	2021	Specification for equipment for building certifiers databases prepared.				Interview with selected officials at PO-RALG on specifications and applicability. Publication of specifications.

	3.6 Number of hardware, software, and office furniture for PO-RALG procured.	Progress reports, Ministry reports, PO-RALG reports.	0	2021	5			5	Assessment report of equipment procured and their use. Delivery note, hand over report signed by beneficiary institution.
	3.7 Number of National full-time expert recruited and embedded within PO-RALG.	Progress reports, Ministry reports, PO-RALG reports,	0	2021	1			1	Performance assessment by UNDP and beneficiary institution of the recruited experts.
<b>Action 4</b> Enhance Energy Consumption Data of Large Energy Consumers	4.1 An online bottom-up energy data collection system developed and implemented.	Training reports, progress reports, workshop reports, Ministry reports, NBS reports, consultancy reports.	Absence of online bottom-up energy data collection system.	2021		An online bottom-up energy data collection system implemented.			Survey on the accessibility, reliability, and usability of EE data. Publication of related data by NBS.
	4.2 Technical advisory report in place.	Progress reports, Ministry reports, NBS reports, consultancy reports.	Absence of technical advisory report.	2021	Technical advisory report prepared.				Review of the technical report produced.

	4.3 An Energy Efficiency information system (internet and paper publications) established and operational.	Training reports, progress reports, workshop reports, Ministry reports, NBS reports, consultancy reports.	Absence of Energy Efficiency information system (internet and paper publications).	2021		An Energy Efficiency information system (internet and paper publications) operational.			Review report of the information systems to assess impacts. Internet and paper publications.
	4.4 A coordinated strategy and information plan designed and implemented.	Progress reports, workshop reports, Ministry reports, NBS reports, consultancy reports.	Absence of coordinated strategy and information plan.	2021		A coordinated strategy and information plan implemented.			Interview with selected stakeholders to assess the implementation of the strategy.
	4.5 Hardware, software and office furniture procured.	Progress reports, Ministry reports, NBS reports.	None	2021	Hardware, software and office furniture procured.				Assessment report of equipment procured and their use. Delivery note, hand over report signed by beneficiary institution.
	4.6 Number of national expert part-time recruited and embedded within NBS.	Progress reports, Ministry reports, NBS reports,	0	2021	1			1	Performance assessment by UNDP and beneficiary institution of the recruited experts.

<b>Action 5</b> Development and implementation of a framework for management of large energy consumers	5.1 The methodology to identify, classify, and notify large energy consumers developed.	Progress reports, Ministry reports, TIRDO reports.	Absence of the methodology to identify, classify, and notify large energy consumers.	2021	The methodology to identify, classify, and notify large energy consumers in place.				Consultation with relevant stakeholders on the methodology. Validation meetings minutes and reports.
	5.2a. Assessment of energy management practices of large energy consumers undertaken.  5.2b. Duties, responsibilities and obligations for large energy consumers adopted and operationalized.	Workshop reports, Progress reports, Ministry reports, TIRDO reports, consultancy reports.	5.2a Absence of assessment of energy management practices of large energy consumers.  5.2b. No operational duties, responsibilities, and obligations for large energy consumers.	2021		5.2a. Assessment of energy management practices of large energy consumers done.  5.2b. Duties, responsibilities and obligations for large energy consumers operationalized.			Survey report conducted on large energy consumers using both qualitative and quantitative approaches.
	5.3 Energy management and Energy Efficiency measures for public institutions and utilities in place.	Training reports, Progress reports, Ministry reports, TIRDO reports.	Absence of Energy management and Energy Efficiency measures for public institutions and utilities.	2021		Energy management and Energy Efficiency measures for public institutions and utilities prepared.			Survey report to assess the application of the newly established measures.
	5.4 Number of personnel of large energy consumers trained.	Training reports, progress reports, workshop reports, Ministry reports, TIRDO reports, field visits reports.	0	2021	30	30		60	Interview to understand the level of knowledge and its usability. Entry and exit tests and reports of trainings.

	5.5 Number TIRDO personnel trained.	Training reports, progress reports, workshop reports, Ministry reports, TIRDO reports.	0	2021	20	20		40	Interviews to understand the level of knowledge and its usability. Entry and exit tests and reports of trainings
	5.6 A Monitoring and Verification Scheme developed and implemented.	Progress reports, workshop reports, Ministry reports, TIRDO reports, consultancy reports.	Absence of Monitoring and Verification Scheme.	2021		A Monitoring and Verification Scheme implemented			Assessment survey of the extent of implementation of the Verification Scheme.
	5.7 Hardware, software, and office furniture for TIRDO procured.	Progress reports, Ministry reports, TIRDO reports.	None	2021	Hardware, software, and office furniture for TIRDO procured.				Assessment report of equipment procured and their use. Delivery note, hand over report signed by beneficiary institution.
	5.8 Number of Full-time national expert embedded within TIRDO	Progress reports, Ministry reports, TIRDO reports.	0	2021	1			1	Performance assessment by UNDP and beneficiary institution of the recruited experts.

<b>Action 6</b> Development of professional qualifications and skills in Energy Management and Audit	6.1 New regulation framework for professional qualifications and certification in Energy Management and Audit developed and adopted.	Progress reports, workshop reports, Ministry reports, DIT reports.	Absence of new regulation framework for professional qualifications and certification in Energy Management and Audit.	2021		New regulation framework for professional qualifications and certification in Energy Management and Audit adopted.			Review of professional qualification involving selected EE experts. Gazettement of the new regulations
	6.2 Number of people at TIRDO and DIT trained.	Training reports, progress reports, workshop reports, Ministry reports, DIT reports, consultancy reports.	0	2021	20	20		40	Interviews to understand the level of knowledge and its usability. Entry and exit test and reports of trainings
	6.3 Equipment for the new Energy Efficiency laboratory at DIT procured.	Progress reports, Ministry reports, DIT reports.	None	2021		Equipment for the new Energy Efficiency laboratory at DIT in place.			Assessment survey of equipment procured and their use. Assessment report of equipment procured and their use. Delivery note, hand over report signed by beneficiary institution

	6.4 Official certification registers and suitable procedures for updating EWURA and MOE's websites in place.	Progress reports, Ministry reports, DIT reports, consultancy reports.	Absence of official certification registers and suitable procedures for updating EWURA and MOE's.	2021		Official certification registers and suitable procedures for updating EWURA and MOE's websites prepared.			Survey to assess the usability of the certification registers. Publication on websites of the procedures
	6.5 Number of girls/women supported through international activities.	Progress reports, workshop reports, Ministry reports, DIT reports.	0	2021	10	10	10	30	Survey report on beneficiaries to assess the gender and the level of knowledge and experience gained, and impacts.
	6.6 Hardware, software and office furniture for DIT procured.	Progress reports, Ministry reports, DIT reports.	None	2021	Hardware, software, and office furniture for DIT procured.				Assessment report of equipment procured and their use. Delivery note, hand over report signed by beneficiary institution.
	6.7 Number of 1 Full-time national expert in gender equality and organization embedded within DIT procured.	Progress reports, Ministry reports, DIT reports.	0	2021	1			1	Performance assessment by UNDP and beneficiary institution of the recruited experts.



<b>Action 7</b> Create Energy Efficiency Awareness of the Public	7.1 Awareness Raising Plan in place.	Progress reports, Ministry reports, consultancy reports.	Absence of Awareness Raising Plan.	2021	Awareness Raising Plan prepared.				Survey report to document the level of awareness and application of the information. Media publications and dissemination.
	7.2 Number of personnel of MOE, EWURA, TANESCO, water utilities and other implementing Agencies trained.	Training reports, progress reports, workshop reports, Ministry reports.	0	2021	10	10		20	Interview to understand the level of knowledge and its usability. Entry and exit tests and reports of trainings
	7.3 Number of awareness raising campaigns on Energy Efficiency conducted.	Progress reports, workshop reports, Ministry reports.	0	2021	5	5	5	15	Survey to document the level of awareness and application of the information. Media publications and dissemination

	7.4 Number of large consumers and SMEs accessing advisory services on energy efficiency.	Progress reports, workshop reports, Ministry reports.	0	2021	30	30	30	90	Survey with targeted beneficiaries to understanding the level of accessibility and reliability of the advisory services.
	7.5 An Energy Efficiency Action Plan website established and operationalized.	Progress reports, workshop reports, Ministry reports, Consultancy reports.	Absence of Energy Efficiency Action Plan website.	2021	An Energy Efficiency Action Plan website operationalized.				Regular review of the sustainability of the website including upload of new data, and user traffic.
	7.6 Number of Energy Efficiency Action Plan Progress Reports produced and disseminated.	Progress reports, workshop reports, Ministry reports.	0	2021	1	1	1	3	Review of key project report – desk review. Publications and dissemination on media
	7.7 Number of National Annual Energy Efficiency Conference held.	Progress reports, Conference reports, Ministry reports.	0	2021	1	1	1	3	Participants feedback report. Conference minutes and deliberations.

	7.8 Number of national and international study tours undertaken	Progress reports, Conference reports, Ministry reports.	0	2021	2	2	2	6	Interviews with selected officials pre and post missions. Study tour reports of selected officials.
	7.9 Number of Full-time National Expert in Energy Efficiency in charge of the "Advisory service" recruited and embedded in MOE.	Progress reports, Ministry reports.	0	2021	1			1	Performance assessment by UNDP and beneficiary institution of the recruited experts.
	7.10 Number of Full-time National Expert in Energy Efficiency Awareness raising in charge of awareness raising recruited and embedded in MOE.	Progress reports, Ministry reports.	0	2021	1			1	. Performance assessment by UNDP and beneficiary institution of the recruited experts.
<b>Action 8 Project Management</b>	8. 1 MOE: Project Coordination Unit (PCU)	UNDP reports, Ministry reports.	0	2021	1			1	Performance review of the PCU to understand and rectify challenges. Performance assessment by UNDP and beneficiary institution of the recruited experts.

	8.2 UNDP: Project Management Unit (PMU) - Project office	UNDP reports, Ministry reports.	0	2021	1			1	Performance review of the PMU to understand and rectify challenges. Performance assessment by UNDP and beneficiary institution of the recruited experts.
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### **Monitoring and Evaluation approach**

In accordance with UNDP's programming policies and procedures, the Project will be monitored through the following monitoring and evaluation (M&E) plans:

Under the guidance of the Project Management Unit (PMU) at UNDP, the Project Coordination Unit (PCU) at MOE will implement the M&E plans, which will include: organising project evaluations, preparing annual work plans, propose budget revisions to be approved by the Board Meeting and in accordance with the provisions of the General Conditions of the EU-UNDP Contribution Agreement, monitoring progress, identifying problems, and suggesting remediating actions, facilitating timely delivery of Project outputs, and supporting the coordination of the implementation institution for the related Actions.

An inception workshop shall be held within the first one month of the Project start. The workshop should address a number of key issues including:

- Assisting all the implementing partners to fully understand and take ownership of the Project.
- Detailing the roles, support services and complementary responsibilities of the Project team.
- Discussing the roles, functions, and responsibilities within the Project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms.
- Finalizing the first annual work plan, based on the Project results framework.
- Reviewing and agreeing on the indicators, targets, and their means of verification, and recheck assumptions and risks.
- Providing a detailed overview of reporting and M&E requirements.
- Scheduling the agreed M&E work plan and budget.
- Discussing financial reporting procedures, obligations as foreseen in General Conditions, Annex 2 to EU-UNDP Contribution Agreement.
- Planning and scheduling the PB meetings.
- Defining the roles and responsibilities of entire Project organisation structure.
- Conducting the first PB meeting within the first 6 months following the inception workshop.

An inception workshop report is a key reference document and will be prepared and shared with the participants within the period of three weeks to formalize various agreements and plans decided upon, during the meeting. Trainings will be provided to all relevant stakeholders on data collection and reporting for effective capture of Project conditions.

Under PMU guidance, the PCU shall track progress made in implementation of the project Actions on Quarterly basis. The risk log shall be regularly updated, based on the initial risk analysis submitted. On annual basis, the Annual Project Reports shall be prepared to monitor the progress in accordance to Article 3 of the General Conditions. The Annual Project reports shall be prepared and submitted to the Project Board for approval. These Reports shall then be submitted to the EU.

The Project shall also be monitored through periodic site visits involving MOE and UNDP. These visits will be organized based on agreed schedule in the Project's Inception Report/Annual Work Plan to assess first-hand Project progress. There shall be an Annual Joint Field Missions comprised of the MOE, UNDP and EU that will be carried out in line with article 10 of the General Conditions of this Contribution Agreement. Other members of the Project Board shall join these joint visits. Field Visit Reports shall be prepared by the PCU in collaboration with PMU and shall be shared within one month after the visit to the PB.

#### *Mid-term evaluation*

The Project will undergo an independent Mid-Term Evaluation (MTE) at the mid-point of Project implementation. The MTE will determine progress being made towards the achievement of outcomes and will identify the course of correction if needed. It will focus on the effectiveness, efficiency, and timeliness of Project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learnt about the Project design, implementation, and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the Project's term. The organization, terms of reference and timing of the mid-term review will be decided after consultation with concerned parties. The Terms of Reference for the Mid-term review will be prepared by PCU under the guidance of UNDP.

#### *End of Project evaluation*

An independent Terminal Evaluation (TE) will take place three months prior to the final PB meeting and will be conducted under the guidance of UNDP. The TE will focus on the delivery of the Project's results as initially planned (and as corrected after the mid-term review, if any such correction took place). The Evaluation will look at the impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference (ToR) for this evaluation will be prepared by PCU under the guidance of UNDP. The Evaluation will also include a survey to assess the increased adoption of the Energy Efficiency measures and standards, and improved energy savings from various equipment.

At the end of the implementation period, the Project team shall prepare the Project Final Report in line with article 3 of the General Conditions of the Contribution Agreement. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learnt, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the Project's results. Overall, mid-term and final evaluation activities will contribute in:

- Improving the programme effectiveness and delivery towards Tanzania's EE goals through using the knowledge and lessons learnt from its implementation expressed in the country.
- Aligning the strategic activities of the Project and ensure that it remains relevant in address the country level objectives whilst also aligning with the global initiative on EE such as through SE4ALL Initiative.

#### **Approach for gender mainstreaming**

Besides the specific actions of this project aiming at promoting the presence of women among Energy Efficiency professionals, wherever possible, women consultants/experts will be engaged for training, monitoring data collection, survey, etc. Women participation will be encouraged throughout. The monitoring will focus on capturing gender benefits and their feedback on the Project interventions.

### Learning and knowledge sharing

Results from the Project will be disseminated within and beyond the Project intervention zone through the existing information sharing networks and forums based on the Project Communication and Visibility Plan (see Annex 6 for more details). The Project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to the Project implementation through lessons learnt. The Project will identify, analyse, and share the lessons learnt that might be beneficial in the design and implementation of similar future Projects.

The summary of monitoring plan and budget is provided below:

Monitoring Activity	Purpose	Frequency	Expected Action	Partners (if joint)	Cost (if any)
<b>Track results progress</b>	Progress data against the results indicators in the RRF will be collected and analysed to assess the progress of the Project in achieving the agreed outputs.	Quarterly, or in the frequency required for each indicator.	Slower than expected progress will be addressed by Project management.	PCU/UNDP/EU	Part of mandates of Project Manager
<b>Monitor and Manage Risk</b>	Identify specific risks that may threaten achievement of intended results. Identify and monitor risk management actions using a risk log. This includes monitoring measures and plans that may have been required as per UNDP's Social and Environmental Standards. Audits will be conducted in accordance with UNDP's audit policy to manage financial risk.	Quarterly	Risks are identified by Project management and actions are taken to manage risk. The risk log is actively maintained to keep track of identified risks and actions taken.	PCU/UNDP/EU	Part of mandates of Project Manager
<b>Learn</b>	Knowledge, good practices, and lessons will be captured regularly, as well as actively sourced from other Projects and partners and integrated back into the Project.	At least annually	Relevant lessons are captured by the Project team and used to inform management decisions.	PCU/UNDP/EU	Part of mandates of Project Manager
<b>Annual Project Quality Assurance</b>	The quality of the Project will be assessed against UNDP's quality standards to identify Project strengths and weaknesses and to inform	Annually	Areas of strength and weakness will be reviewed by Project management	PCU/UNDP/EU	Part of mandates of

	management decision making to improve the Project.		and used to inform decisions to improve Project performance.		Project Manager
<b>Review and Make Course Corrections</b>	Internal review of data and evidence from all monitoring actions to inform decision making.	At least annually	Performance data, risks, lessons, and quality will be discussed by the Project board and used to make course corrections.	PCU/UNDP/EU	Part of mandates of Project Manager
<b>Project Report</b>	A progress report will be presented to the Project Board and key stakeholders, consisting of progress data showing the results achieved against pre-defined annual targets at the output level, the annual Project quality rating summary, an updated risk log with mitigation measures, and any evaluation or review reports prepared over the period. A quarterly succinct narrative report will also be produced for a more frequent updating on the progress of the project	Quarterly, Annually, and at the end of the Project (final report)		PCU/UNDP/EU	Part of mandates of Project Manager
<b>Project Review (Project Board)</b>	The Project's governance mechanism (i.e., Project Board) will hold regular Project reviews to assess the performance of the Project and review the Multi-Year Work Plan to ensure realistic budgeting over the life of the Project. In the Project's final year, the Project Board shall hold an end-of Project review to capture lessons learned and discuss opportunities for scaling up and to socialize Project results and lessons learned with relevant audiences.	Specify frequency (i.e., at least annually)	Any quality concerns or slower than expected progress should be discussed by the Project board and management actions agreed to address the issues identified.	PCU/UNDP/EU	Part of mandates of Project Manager

### Evaluation Plan

Evaluation Title	Partners (if joint)	Related Strategic Plan Output	UNDAF/CPD Outcome	Planned Completion Date	Key Evaluation Stakeholders
Mid-Term Evaluation	PCU/UNDP/EU	Improved institutional capacity and knowledge management, enhanced conducive environment for investments in sustainable energy, scale up and roll outs of sustainable energy initiatives	Increased access to affordable and sustainable energy	2023	All relevant stakeholders in the EE space.



Final Evaluation	PCU/UNDP/EU	Improved institutional capacity and knowledge management, enhanced conducive environment for investments in sustainable energy, scale up and roll outs of sustainable energy initiatives	Increased access to affordable and sustainable energy	2024	All relevant stakeholders in the EE space.
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## VII. IMPLEMENTATION TIMELINE

### Duration of the project

It is planned that the duration of the project will be 36 months

### Inception phase

The project will begin with an intense three-month Inception phase that will allow for a detailed verification of the procurements and related technical specifications of the equipment to be provided to the Institutions benefiting from the program as approved by the Project Board. This phase will kick-start with an inception workshop to be held within the three initial weeks of the project. The delivery of the inception workshop will be the inception report that will include an updated timeline and updated list of activities to be undertaken within the three-month inception phase. The Board meeting will be held at the end of the inception phase to validate and approve the Annual work plan, following which the proper implementation of the actions will start.

Workstream	Results	Timetable
Project inception with a kick-off inception meeting involving all stakeholders.	Inception workshop report, updated timeline	1 <sup>st</sup> – 3 <sup>rd</sup> week
Recruitment of the Project Manager and Admin/Logistic Officer	Project staff recruited	2 <sup>nd</sup> - 8 <sup>th</sup> weeks
Recruitment of experts to be embedded in implementing institutions	Experts recruited	2 <sup>nd</sup> - 8 <sup>th</sup> weeks
Setting up of operational framework – meetings with implementing institutions.	Project management structure clearly defined clear communication, and governance channels	3 <sup>rd</sup> week
Verification of list of equipment and technical specifications for each Institution benefitting from the program	Detailed equipment needs assessment – with specs and costs	8 <sup>th</sup> – 12 <sup>th</sup> week
Validation by Project Board	Validation report	10 <sup>th</sup> – 12 <sup>th</sup> week
Implementation of the Actions as per the Multi-Year Work Plan timeline	Deliverables as per the Multi-Year Work Plan	12 <sup>th</sup> week – to the end of the project
Quarterly progress monitoring	Short description of progress including problems encountered; planned work for the next quarter.	Quarterly.
Quarterly newsletter	Newsletters	See Communications and visibility plan
Yearly progress reporting	Annual progress reports	Yearly
Final project reporting	Final report	3 <sup>rd</sup> year
Mid-term and Terminal evaluations	Evaluation reports	1.5 years and 3 <sup>rd</sup> year respectively

## Multi-Year Plan

Action	Activity	Component	Budget per Year		
			Y1	Y2	Y3
Action 1: Review and update the Energy Efficiency Action Plan and prepare the Energy Efficiency Strategy to be aligned into the Action Plan	1.1 Prepare the Energy Efficiency Strategy	1.1.1 Technical working sessions of the Government Task Team to review related initiatives and prepare the Draft EE Strategy	X		
		1.1.2 Consultation workshop with all involved stakeholders	X		
		1.1.3a Update of the Energy Efficiency Strategy draft by the Consultant	X		
		1.1.3b Update of the Energy Efficiency Strategy draft by the Consultant	X		
		1.1.4 Validation Workshop of the EE Strategy	X		
	1.2 Review and update the First Energy Efficiency Action Plan	1.2.1 Technical working sessions of the Government Task Team to review and prepare the Draft EE Action Plan	X		
		1.2.2 Consultation workshop with all involved stakeholders	X		
		1.2.3a Update of the Energy Efficiency Action Plan draft	X		
		1.2.3b Update of the Energy Efficiency Action Plan draft	X		
		1.2.4 Validation workshop of the EE Action Plan	X		
Action 2: Development of Minimum Energy Performance Standards (MEPS) and Labelling	2.1 Create a MEPS National Committee for an ongoing consultation of all stakeholders involved and organize its activities.	2.1.1 Identify stakeholders to involve in the Committee: MoE, Ministry of Industry and Trade, EWURA, TANESCO, TBS, TRA, companies performing Pre-Shipment Verification of Conformity, regional programs, representatives of local manufacturers, importers, distributors, and retailers, etc.			
		2.1.2 Definition of duties and functions of the MEPS Committee			
		2.1.3 Identification and assignment of the MEPS National Committee members			
		2.1.4 Creation of the organizational office of the MEPS National Committee within the MOE			
		2.1.5 Definition of procedures of convocation and communication of the Committee			
	2.2 Define and implement new regulations for MEPS and label classifications of selected energy consuming products.	2.2.1 Preparatory work to define Minimum Energy Performance Standards for selected products	X		
		2.2.2 Propose Minimum Energy Performance Standards	X		
		2.2.3 Identify energy efficiency label classification and format	X		
		2.2.4 Define processes and procedures to monitor, revise and update MEPS regulation	X		
		2.2.5a Design and adopt policy framework and realization of a final consultative workshop	X		
	2.2.5b Design and adopt policy framework and realization of a final consultative workshop	X			

2.3 Define the testing procedures at TBS for new selected energy consuming products and technical advice for the procurement of new testing facilities at TBS.	2.3.1 Define new testing procedures & technical advice for the procurement of new testing equipment	X		
	2.3.2 Procurement of new testing equipment	X		
2.4 Development of new testing capabilities of TBS, MoE and Ministry of Industry personnel.	2.4.1a Select and need assessment of the TBS, MoE and Ministry of Industry personnel		X	
	2.4.1b Select and need assessment of the TBS, MoE and Ministry of Industry personnel		X	
	2.4.2a Design capacity building activities		X	
	2.4.2b Design capacity building activities		X	
	2.4.3a Develop support materials for capacity building		X	
	2.4.3b Develop support materials for capacity building		X	
	2.4.3c Develop support materials for capacity building		X	
	2.4.4a Implement capacity building activities		X	
	2.4.4b Implement capacity building activities		X	
	2.4.4c Implement capacity building activities		X	
2.5 Develop and implement verification and enforcement systems	2.5.1 Definition of processes and procedures for the verification and enforcement system		X	
	2.5.2a Design, organize and implement capacity building for custom and TRA personnel to perform the inspections of imported products		X	
	2.5.2b Design, organize and implement capacity building for custom and TRA personnel to perform the inspections of imported products		X	
2.6 Design and adopt of a policy support and framework: regulatory, financial, fiscal supportive framework and incentives	2.6.1a Define methodologies and procedures to monitor the implementation of the MEPS framework		X	
	2.6.1b Define methodologies and procedures to monitor the implementation of the MEPS framework		X	
	2.6.2a Design and implement methodology and procedures to measure the savings		X	
	2.6.2b Design and implement methodology and procedures to measure the savings		X	
	2.6.3a Identify suitable indicators		X	
	2.6.3b Identify suitable indicators		X	
	2.6.4a Design, propose and adopt of a policy support and Framework.		X	
	2.6.4b Design, propose and adopt of a policy support and Framework.		X	
2.7 Learning and replication, and implementation of capacity building activities	2.7.1a Analysis of MEPS scheme implementation, identification of best practices and market assessment to identify further energy consuming products and appliances to be covered by MEPS scheme	X		
	2.7.1b Analysis of MEPS scheme implementation, identification of best practices and market assessment to identify further energy consuming products and appliances to be covered by MEPS scheme	X		

		2.7.2a MEPS scheme implementation for new products and appliances throughout a consultative process	X		
		2.7.2b MEPS scheme implementation for new products and appliances throughout a consultative process	X		
		2.7.3a Organization of the consultative workshop	X		
		2.7.3b Organization of the consultative workshop	X		
		2.7.3c Organization of the consultative workshop	X		
	2.8 Develop and implement monitoring, verification and enforcement scheme	2.8.1a Analysis of MEPS scheme implementation	X		
		2.8.1b Analysis of MEPS scheme implementation	X		
		2.8.2a Elaboration of monitoring, verification and enforcement scheme	X		
		2.8.2b Elaboration of monitoring, verification and enforcement scheme	X		
		2.8.3a Organization of the consultative workshop	X		
		2.8.3b Organization of the consultative workshop	X		
		2.8.3c Organization of the consultative workshop	X		
		2.8.4a Finalize and adopt monitoring, verification and enforcement scheme	X		
		2.8.4b Finalize and adopt monitoring, verification and enforcement scheme	X		
	2.9 1 Full-time National Expert	2.9.1 1 National expert in testing facilities embedded within TBS structure	X	X	X
	2.10 Procurement of hardware, software and office furniture for TBS	2.10.1 Several hardware, software and office furniture procured for TBS	X		
Action 3: Implementation of a framework for energy performance certification in large buildings	3.1 Develop and mainstream a regulatory framework for energy efficiency of large buildings into existing regulation, including Energy Efficient Building Codes (EEBC) and Energy Performance Certification (EPC) scheme.	3.1.1a Review and assess the Deliverables of the EU TAF assignment "Preparation of Energy Performance Certification of Larger Buildings in Tanzania"	X		
		3.1.1b Review and assess the Deliverables of the EU TAF assignment "Preparation of Energy Performance Certification of Larger Buildings in Tanzania"	X		
		3.1.2a Define an Energy Efficient Building Codes (EEBC) framework	X		
		3.1.2b Define an Energy Efficient Building Codes (EEBC) framework	X		
		3.1.3a Define methodology and procedures to be used for the Certification of large buildings	X		
		3.1.3b Define methodology and procedures to be used for the Certification of large buildings	X		
		3.1.4a Develop the regulatory framework for EEBC and EPC	X		
		3.1.4b Develop the regulatory framework for EEBC and EPC	X		
		3.1.5a Organize stakeholders' consultative workshops: MoE, PO-RALG, DIT, TIRDO, representatives of the construction industry, representatives of professionals involved in the construction sector, etc.	X		
		3.1.5b Organize stakeholders' consultative workshops: MoE, PO-RALG, DIT, TIRDO, representatives of the construction industry, representatives of professionals involved in the construction sector, etc.	X		

	3.1.5c Organize stakeholders' consultative workshops: MoE, PO-RALG, DIT, TIRDO, representatives of the construction industry, representatives of professionals involved in the construction sector, etc.	X		
	3.1.6a Validate and adopte the EEBC and EPC framework	X		
	3.1.6b Validate and adopte the EEBC and EPC framework	X		
	3.1.6c Validate and adopte the EEBC and EPC framework	X		
	3.1.7a Validate the regulatory framework and mainstream it into existing regulation	X		
	3.1.7b Validate the regulatory framework and mainstream it into existing regulation	X		
	3.1.7c Validate the regulatory framework and mainstream it into existing regulation	X		
	3.1.8a Design and develop a public web page for a quick search of Building Certifiers available in the country	X		
	3.1.8b Design and develop a public web page for a quick search of Building Certifiers available in the country	X		
3.2 Design, organize and implement gender-responsive trainings and Capacity Building and training activities for: PO-RALG selected officials; Officials of selected City Councils; Officials of MoE, EWURA and TANESCO; designers, architects and engineers.	3.2.1a Plan, organize and conduct specific trainings on EEBC and EPC for designers, architects and engineers involved in building construction (several training sessions during three years)	X	X	X
	3.2.1b Plan, organize and conduct specific trainings on EEBC and EPC for designers, architects and engineers involved in building construction (several training sessions during three years)	X	X	X
	3.2.1c Plan, organize and conduct specific trainings on EEBC and EPC for designers, architects and engineers involved in building construction (several training sessions during three years)	X	X	X
	3.2.2a Assessment of level of knowledge and capacities on energy efficiency in buildings of PO-RALG staff, national government Officials and local government Officials of selected cities	X	X	X
	3.2.2b Assessment of level of knowledge and capacities on energy efficiency in buildings of PO-RALG staff, national government Officials and local government Officials of selected cities	X	X	X
	3.2.3a Design, organize and conduct capacity building activities for PO-RALG staff, national government Officials (MoE, EWURA and TANESCO) and local government Officials of selected cities (at least twice in three years)	X	X	X
	3.2.3b Design, organize and conduct capacity building activities for PO-RALG staff, national government Officials (MoE, EWURA and TANESCO) and local government Officials of selected cities (at least twice in three years)	X	X	X
	3.2.3c Design, organize and conduct capacity building activities for PO-RALG staff, national government Officials (MoE, EWURA and TANESCO) and local government Officials of selected cities (at least twice in three years)	X	X	X

	3.3 Realize EPC large buildings pilot projects in selected cities.	3.3.1a Identify and select cities for the implementation of the pilot project		X	
		3.3.1b Identify and select cities for the implementation of the pilot project		X	
		3.3.2a Plan, organise and implement capacity building activities for local Officials of selected cities		X	
		3.3.2b Plan, organise and implement capacity building activities for local Officials of selected cities		X	
		3.3.3a Organise and implement pilot projects		X	
		3.3.3b Organise and implement pilot projects		X	
		3.3.3c Organise and implement pilot projects		X	
		3.3.4a Analyse the results of pilot projects and modify accordingly procedures and methodologies		X	
		3.3.4b Analyse the results of pilot projects and modify accordingly procedures and methodologies		X	
		3.3.5a Define the process to extend the activity to other cities		X	
	3.3.5b Define the process to extend the activity to other cities		X		
	3.4 Monitoring and evaluation.	3.4.1a Organization of stakeholders' consultative workshops to discuss challenges and strong elements of the EEBC and EPC (at least two in three years)	X	X	X
		3.4.2b Analysis of the results of the stakeholders' consultative meetings/workshops and implementation into new regulatory frameworks (activity to be performed once a year)			
	3.5 Technical advice for the procurement of equipment.	3.5.1a Technical advice for the procurement of equipment (hardware and software) for PO-RALG needed for the realization of the Certificates and building certifiers database	X		
		3.5.1b Technical advice for the procurement of equipment (hardware and software) for PO-RALG needed for the realization of the Certificates and building certifiers database	X		
3.6 National full-time expert embedded within PO-RALG	3.6.1 National full-time expert embedded within PO-RALG	X	X	X	
3.7 Hardware, software and office furniture for PO-RALG	3.7.1 Hardware, software and office furniture for PO-RALG procured	X			
Action 4: Enhance Energy Consumption Data of Large Energy Consumers	4.1 Plan, develop and implement an online bottom-up energy data collection system of raw statistical information	4.1.1a Assess current level of skills and capacities of the IT staff at NBS		X	
		4.1.1b Assess current level of skills and capacities of the IT staff at NBS		X	
		4.1.2a Design and implement suitable classroom training on the software and hardware that will be used to implement the activity		X	
		4.1.2b Design and implement suitable classroom training on the software and hardware that will be used to implement the activity		X	
		4.1.3a Identify all energy and non-energy data of large energy consumers to be collected for suitable data analysis (it is proposed to fill the data every three months)		X	
		4.1.3b Identify all energy and non-energy data of large energy consumers to be collected for suitable data analysis (it is proposed to fill the data every three months)		X	
		4.1.4a Design and develop suitable data collection tools, methodologies and protocols for collecting energy data consumption		X	

	4.1.4b Design and develop suitable data collection tools, methodologies and protocols for collecting energy data consumption		X	
	4.1.5a Looking for synergies with other questionnaires already submitted to large companies		X	
	4.1.5b Looking for synergies with other questionnaires already submitted to large companies		X	
	4.1.6a Design system architecture and define system requirements specifications for the online data collection from large consumers: software, hardware, database structure, data entry form, data presentation and network infrastructure		X	
	4.1.6b Design system architecture and define system requirements specifications for the online data collection from large consumers: software, hardware, database structure, data entry form, data presentation and network infrastructure		X	
	4.1.7a Develop the online tool for data collection from large energy consumers		X	
	4.1.7b Develop the online tool for data collection from large energy consumers		X	
	4.1.8a Realize and set up the database for data collection on a server at NBS headquarters		X	
	4.1.8b Realize and set up the database for data collection on a server at NBS headquarters		X	
	4.1.9a Developing a manual for training purpose of IT staff in NBS (in particular for future implementation of new functionalities of the system)		X	
	4.1.9b Developing a manual for training purpose of IT staff in NBS (in particular for future implementation of new functionalities of the system)		X	
	4.1.10a Testing and if necessary, update the entire system		X	
	4.1.10b Testing and if necessary, update the entire system		X	
4.2 Technical advice for the procurement of equipment (hardware and software).	4.2.1a Software for the realization of the web tool, Database and Server at NBS	X		
	4.2.1b Procurement of software for the realization of the web tool, Database and Server	X		
4.3 Establish an energy efficiency information system (internet and paper publications) for professionals, the general public and decision makers concerning large energy consumers.	4.3.1a Design and implement a capacity building activity for selected MoE, EWURA, TANESCO and NBS personnel on reporting energy data	X	X	X
	4.3.1b Design and implement a capacity building activity for selected MoE, EWURA, TANESCO and NBS personnel on reporting energy data	X	X	X
	4.3.1c Design and implement a capacity building activity for selected MoE, EWURA, TANESCO and NBS personnel on reporting energy data	X	X	X
	4.3.2 Technical realization of a specific website on EE statistics on the energy consumption of large energy consumers	X	X	X
	4.3.3a Realization of three (once a year) EE brochures for the general public (PDF and printing) on the energy consumption of large energy consumers	X	X	X
	4.3.3b Realization of three (once a year) EE brochures for the general public (PDF and printing) on the energy consumption of large energy consumers	X	X	X



Action 5. Development and implementation of a framework for management of large energy consumers

	4.3.4a Realization of three (once a year) technical documents on EE data for decision makers (PDF and printing) on the energy consumption of large energy consumers	X	X	X
	4.3.4b Realization of three (once a year) technical documents on EE data for decision makers (PDF and printing) on the energy consumption of large energy consumers	X	X	X
	4.3.5a Realization of three (once a year) annual reports on the energy consumption of large energy consumers	X	X	X
	4.3.5b Realization of three (once a year) annual reports on the energy consumption of large energy consumers	X	X	X
4.4 Design and implement an information plan and phone/email support to familiarize respondents with their task.	4.4.1a Design a coordinated strategy and implement the information plan		X	
	4.4.1b Design a coordinated strategy and implement the information plan		X	
	4.4.2a Design and implement an online and phone support for entering online the energy data		X	
	4.4.2b Design and implement an online and phone support for entering online the energy data		X	
4.5 1 National expert part-time embedded within NBS	4.5 1 National expert part-time embedded within NBS	X	X	X
4.6 Hardware, software and office furniture for NBS	4.6.1 Hardware, software and office furniture for NBS	X		
5.1 Develop the methodology and a set of quantitative and qualitative criteria to identify, classify and notify large energy consumers.	5.1.1a. Define the criteria (quantitative and qualitative) to use for identifying large energy consumers			
	5.1.2b Identify, classify and notify large energy consumers			
5.2 Define and mainstream in the legislation duties, responsibilities and obligations for large energy consumers.	5.2.1. Assess energy management practices of large energy consumers		X	
	5.2.1. Assess energy management practices of large energy consumers		X	
	5.2.2. Identification of possible duties, responsibilities and obligations to tackle wrong conducts and enhance area of improvements in large energy consumers		X	
	5.2.2. Identification of possible duties, responsibilities and obligations to tackle wrong conducts and enhance area of improvements in large energy consumers		X	
	5.2.3 Selection and agreement on duties, responsibilities and obligations for large energy consumers and adopt a policy framework; organization of a consultative workshop		X	
	5.2.3 Selection and agreement on duties, responsibilities and obligations for large energy consumers and adopt a policy framework; organization of a consultative workshop		X	
	5.2.4 Assess and prepare legislative requirements to support the implementation		X	
	5.2.4 Assess and prepare legislative requirements to support the implementation		X	
5.3 Identify and recommend energy management and energy efficiency measures for public institutions and utilities.	5.3.1a Analyse energy-mix in supply and demand sides	X		
	5.3.1b Analyse energy-mix in supply and demand sides	X		
	5.3.2a Identify and recommend suitable measures in supply side of utilities	X		
	5.3.2b Identify and recommend suitable measures in supply side of utilities	X		
	5.3.3a Identify and recommend suitable energy efficiency measures in demand side of public institutions and utilities	X		
	5.3.3b Identify and recommend suitable energy efficiency measures in demand side of public institutions and utilities	X		

5.4 Design, develop and implement capacity building activities for selected personnel of large energy consumers.	5.4.1a Design and implement capacity building activities for selected personnel of large energy consumers	X	X	X
	5.4.1b Design and implement capacity building activities for selected personnel of large energy consumers	X	X	X
	5.4.2a Elaborate manuals (in English and Swahili) for the capacity building activity	X	X	X
	5.4.2b Elaborate manuals (in English and Swahili) for the capacity building activity	X	X	X
	5.4.2c Elaborate manuals (in English and Swahili) for the capacity building activity	X	X	X
	5.4.3 Contact large energy consumers in order to invite them to the capacity building activity	X	X	X
	5.4.4a Organize and realize classroom lessons for selected personnel of large energy consumers	X	X	X
	5.4.4 Organize and realize classroom lessons for selected personnel of large energy consumers	X	X	X
	5.4.4b Organize and realize classroom lessons for selected personnel of large energy consumers	X	X	X
	5.4.5a Organize and realize "On the job training" for the personnel that are/will be in charge of energy management on "how to work as energy manager"	X	X	X
	5.4.5b Organize and realize "On the job training" for the personnel that are/will be in charge of energy management on "how to work as energy manager"	X	X	X
	5.4.5c Organize and realize "On the job training" for the personnel that are/will be in charge of energy management on "how to work as energy manager"	X	X	X
	5.4.6a Organize and realize "On the job training" for the elaboration of the Energy Efficiency Action Plan of the large consumers	X	X	X
	5.4.6b Organize and realize "On the job training" for the elaboration of the Energy Efficiency Action Plan of the large consumers	X	X	X
	5.4.6c Organize and realize "On the job training" for the elaboration of the Energy Efficiency Action Plan of the large consumers	X	X	X
5.4.7 Field visits and realization of energy audits in large energy consumers facilities.	X	X	X	
5.5 Technical advice for the procurement of new laboratory equipment for TIRDO in order to implement the Capacity Building Activities, development of equipment use capabilities and enhancement of training capabilities and energy audits of TIRDO personnel.	5.5.1a Technical advice and procurement of equipment	X		
	5.5.1b procurement of equipment	X		
	5.5.1c Renovation of TIRDO building: Minor repairs, painting; lighting; reinforcing room safety with proper doors and grills; air conditioning; these renovation works (in particular new air conditioning and lighting systems) will be implemented taking into consideration energy efficiency solutions to become a small best practice demonstration building.	X		
	5.5.1d Procurement of training consumable materials.	X		
	5.5.1e one vehicle 4WD	X		
	5.5.1f Purchase of manuals, standards and software	X		

		5.5.2 Design training and capacity building activities for TIRDO personnel to increase their capabilities in using new equipment	X			
		5.5.3 Organise and implement training and capacity building activities for TIRDO personnel to increase the capabilities in using new equipment, conducting trainings and performing energy audits	X			
	5.6 Develop and implement Monitoring and Verification Scheme.	5.6.1a Identify the national bodies that will implement the verification and enforcement systems (MoE and/or Ministry of Industry) and related tasks			X	
		5.6.1b Identify the national bodies that will implement the verification and enforcement systems (MoE and/or Ministry of Industry) and related tasks			X	
		5.6.2a Define procedures and methodologies to verify Action implementation			X	
		5.6.2b Define procedures and methodologies to verify Action implementation			X	
		5.6.3a Propose and adopt sanctions and penalties (based on international procedures). Organization and realization of consultative workshop			X	
		5.6.3b Propose and adopt sanctions and penalties (based on international procedures). Organization and realization of consultative workshop			X	
		5.6.3c Propose and adopt sanctions and penalties (based on international procedures). Organization and realization of consultative workshop			X	
		5.6.4a Implement verifications on a sample of the large energy consumers involved in this Action			X	
	5.6.4b Implement verifications on a sample of the large energy consumers involved in this Action			X		
	5.7 1 Full-time national expert embedded within EWURA	5.7.1 1 Full-time national expert embedded within EWURA	X	X	X	
	5.8 Hardware, software and office furniture for EWURA	5.8.1 Hardware, software and office furniture for EWURA	X			
<b>Action 6: Development of professional qualifications and skills in Energy Management and Audit</b>	6.1 Design and support the adoption of new regulation framework for professional qualifications and certification in Energy Management and Audit, including procedures and methodologies for the certification of Energy Managers, Energy Auditors and Building Certifiers and for Energy Auditing Firms (EAF) accreditation.	6.1.1 Assess international practices	X			
		6.1.2 Define and recommend appropriate regulatory framework	X			
		6.1.3 Organization of a consultative workshop with all stakeholders involved and support the adoption of the new regulatory framework	X			
	6.2 Support design and implementation of trainings at TIRDO and DIT for Energy Managers (EM), Energy Auditors (EA) and Building Certifiers (BC), including development of equipment use capabilities of DIT personnel and enhancement of training capabilities of DIT personnel.	6.2.1a Assessment of international practices in terms of training and certification of EM, EA and BC	X	X		
		6.2.1b Assessment of international practices in terms of training and certification of EM, EA and BC	X	X		
		6.2.2a Assessment of the technical instruments and capacity needs of TIRDO and DIT personnel	X	X		
		6.2.2b Assessment of the technical instruments and capacity needs of TIRDO and DIT personnel	X	X		
		6.2.3a Design, develop and implement the "Training of trainers" activity for DIT and TIRDO and enhance their capabilities in training EM, EA and BC	X	X		

		6.2.3b Design, develop and implement the “Training of trainers” activity for DIT and TIRDO and enhance their capabilities in training EM, EA and BC	X	X	
		6.2.3c Design, develop and implement the “Training of trainers” activity for DIT and TIRDO and enhance their capabilities in training EM, EA and BC	X	X	
		6.2.4a Elaborate and update the syllabus and contents of trainings for EM, EA and BC	X	X	
		6.2.4b Elaborate and update the syllabus and contents of trainings for EM, EA and BC	X	X	
		6.2.5 Elaborate, realise and update the support materials for the training for EM, EA ad BC	X	X	
		6.2.5a Elaborate, realise and update the support materials for the training for EM, EA ad BC	X	X	
		6.2.5b Elaborate, realise and update the support materials for the training for EM, EA ad BC	X	X	
	6.3 Technical advice and support to the procurement of equipment for the new Energy Efficiency laboratory at DIT; purchase of standards	6.3.1a Advise on procurement of devices and equipment for the energy efficiency laboratory	X		
		6.3.1b Procurement of devices and equipment for the energy efficiency laboratory	X		
		6.3.1c Purchase of manuals and standards	X		
		6.3.1d Procurement of training consumable materials: Stationeries (Papers, pens, files, folders, flip charts, etc.)	X		
	6.4 Support for setting up and maintain a register of certified EM, EA, BC and EAF and Publication of the Regulation Framework and the list of certified EM, EA, BC and EA firms on EWURA website, MoE website, Gazette of Tanzania.	6.4.1 Create and maintain official certification registers and suitable procedures for update EWURA and MoE's websites and publication on the Gazette of Tanzania		X	
		6.4.2 Procurement of associated software and hardware for the registers		X	
	6.5 Design and implement international activities for DIT students and measures to support education of girls/women	6.5.1 Design and implement suitable measures to support energy education of girls and women: Grant scheme for girls/women		X	
		6.5.2 Design and implement regional/international p2p activities within the EAC area.		X	
	6.6 1 Full-time national expert in gender equality and organization embedded within DIT	6.6.1 1 Full-time national expert in gender equality and organization embedded within DIT	X	X	X
	6.7 Hardware, software and office furniture for DIT	6.7.1 Hardware, software and office furniture for DIT	X		
Action 7: Create Energy Efficiency Awareness of the Public	7.1 Design Awareness Raising Plan including through conducting of opinion research	7.1.1a Desk research	X		
		7.1.1b Desk research	X		
		7.1.2a Opinion research on importers, distributors and retailers of energy consuming appliances and products	X		
		7.1.2b Opinion research on importers, distributors and retailers of energy consuming appliances and products	X		
		7.1.2c Opinion research on importers, distributors and retailers of energy consuming appliances and products	X		
		7.1.3a Opinion research on private and public companies' management	X		

	7.1.3b Opinion research on private and public companies' management	X		
7.2 Design, develop and implement of Capacity Building Activities for selected personnel of MoE, EWURA, TANESCO, water utilities and other implementing Agencies on how to plan and implement a successful awareness raising campaign on energy efficiency: objectives, compelling messages, optimal channels, targeted audiences, logos, timeline, budget, tone, style, etc.	7.2.1a Assess findings and results of the opinion research	X		
	7.2.1b Assess findings and results of the opinion research	X		
	7.2.2a Classroom lessons with best practices description on how to plan, develop and implement a successful awareness raising campaign	X		
	7.2.2b Classroom lessons with best practices description on how to plan, develop and implement a successful awareness raising campaign	X		
7.3 Design, develop and implement awareness raising campaigns on energy efficiency for: general public; private and public companies' management; government and public institutions Officials; decision makers; import companies, dealers, distributors and retailers of energy consuming products; high school and University students.	7.3.1 For the general public explaining benefits and opportunities of energy efficiency and educating consumers on the importance of saving energy; special focus should be given to the involvement of women using appliances at home	X	X	X
	7.3.2 For the general public on Action number 2 to describe labelling and energy efficiency classification of the five selected products	X	X	X
	7.3.3 For the management of large energy consumers (see Action 4)	X	X	X
	7.3.4 For government Officials and TANESCO, EWURA and water utilities personnel	X	X	X
	7.3.5 For national and local decision makers on energy efficiency potential and opportunities (short information briefs, workshops and meetings); special focus should be given on how right policies could foster women and girls role in energy efficiency	X	X	X
	7.3.6 For the management of SMEs, industrial companies, large commercial buildings (hotels, office buildings, sports halls, fitness centres, etc.) and public national and local institutions to foster the procurement of energy efficient appliances and devices (workshops, leaflets, articles in industry publications, etc.)	X	X	X
	7.3.7 For import-export companies, dealers, distributors and retailers (see Action 2)	X	X	X
	7.3.8 For high school and University students to encourage them to study energy efficiency related matters and start new businesses in areas relevant to energy efficiency development; this campaign should also focus on girls	X	X	X
7.4 Design, develop and implement an "Advisory Service" directed at supporting large energy consumers and SMEs in implementing energy efficiency actions.	7.4.1a Design, develop and implement an "Advisory Service" directed at supporting large energy consumers and SMEs in implementing energy efficiency actions: Stakeholders' consultation, translation and printing			
	7.4.1b Design, develop and implement an "Advisory Service" directed at supporting large energy consumers and SMEs in implementing energy efficiency actions: Stakeholders consultation + Translation and Printing	X		
	7.4.1c Design, develop and implement an "Advisory Service" directed at supporting large energy consumers and SMEs in implementing energy efficiency actions: Stakeholders consultation, translation and printing	X		
7.5 Design, develop and realize an "Energy Efficiency Action Plan" website.	7.5.1 Technical realization and update of the EEAP webpage	X		

	7.6 Disseminate information and realize every year an “Energy Efficiency Action Plan Progress Report”.	7.6.1a Publication of three (once a year) of an “Energy Efficiency Action Plan Progress Report”, including the quantification of the level of energy savings: Validation Workshop + Translation and printing materials	X	X	X	
		7.6.1b Publication of three (once a year) of an “Energy Efficiency Action Plan Progress Report”, including the quantification of the level of energy savings: Validation Workshop + Translation and printing materials	X	X	X	
		7.6.1c Publication of three (once a year) of an “Energy Efficiency Action Plan Progress Report”, including the quantification of the level of energy savings: Validation Workshop + Translation and printing materials	X	X	X	
		7.6.1d Publication of three (once a year) of an “Energy Efficiency Action Plan Progress Report”, including the quantification of the level of energy savings: Validation Workshop + Translation and printing materials	X	X	X	
	7.7 Organize an annual "National Energy Efficiency Conference”.	7.7.1 Organization of three (one a year) annual "National Energy Efficiency Conference"	X	X	X	
	7.8 Organize national and international study tours for Officials of MoE, EWURA, TANESCO, water utilities and other implementing Agencies	7.8.1 Organization of 6 study tours, 5 Officials per study tour	X	X	X	
	7.9 1 Full-time National Expert in energy efficiency in charge of the "Advisory service"	7.9.1 1 Full-time National Expert in energy efficiency in charge of the "Advisory service"	X	X	X	
	7.10 1 Full-time National Expert in energy efficiency Awareness raising in charge of awareness raising	7.10.1 1 Full-time National Expert in energy efficiency awareness raising in charge of awareness raising	X	X	X	
	<b>Action 8: Project Management</b> X	<b>8. 1 MOE: Project Coordination Unit (PCU)</b>	8.1.1 Project manager (1 international expert)	X	X	X
			8.1.2 Logistics/Administration staff (1 national expert)	X	X	X
8.1.3 Two (2) 4WD vehicles for MoE			X			
8.1.4 Software, hardware and office equipment for MoE			X			
8.1.5a Organization of Inception workshop			X	X	X	
8.1.5b Organization of Validation Workshop			X	X	X	
8.1.5c Organization of workshops, meetings, conferences and events			X	X	X	
8.1.5d Organization of Board meetings			X	X	X	
8.1.6a Project Evaluations (Mid-Term Evaluations)			X		X	
8.1.6b Project Evaluations (Mid-Term Evaluations)			X		X	
8.1.6c Validation workshop for Mid-term evaluation			X			
8.1.7d Project Evaluations (Terminal Evaluations)			X		X	
8.1.7e Project Evaluations (Terminal Evaluations)			X		X	
8.1.7f Validation workshop for Terminal evaluation			X			
8.1.8a Project Office costs: Office space rent			X	X	X	
8.1.8b Project Office costs: Furnishing			X			
8.1.8c Project Office costs: Utilities (Electricity, Water, IT, Telecommunication)			X	X	X	
8.1.8d Project Office costs: Other costs (Security, Maintenance, Repair)	X	X	X			

<b>8.2 UNDP: Project Management Unit (PMU) - Project office</b>	8.1.8e Project Office costs: Consumables.	X	X	X
	8.2.1 Monitoring	X	X	X
	8.2.2 Communication and ICT	X	X	X
	8.2.3 Programme Specialist	X	X	X
	8.2.4 Project Quality Assurance Officer	X	X	X
	8.2.5 Programme Analyst	X	X	X
	8.2.6 Communication Analyst	X	X	X
	8.2.7 Programme Associate	X	X	X
	8.2.8 Programme Finance Associate	X	X	X
	8.2.9 Procurement Associate	X	X	X
	8.2.10a Project Office costs: Furnishing	X	X	X
	8.2.10b Project Office costs: Utilities (Electricity, Water, IT, Telecommunication)	X	X	X
	8.2.10c Project Office costs: Other costs (Security, Maintenance, Repair)	X	X	X
	8.2.10d Project Office costs: Consumables	X	X	X

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## VIII. GOVERNANCE AND MANAGEMENT ARRANGEMENTS – PROJECT OFFICE

The Project will be implemented through Direct Implementation Modality (DIM) with the support of the existing **Project Management Unit (PMU)** within UNDP in accordance with UNDP's rules and regulations and the provisions of the General Conditions (Annex 2 to the EU-UNDP Contribution Agreement). The implementation entails to spearhead and implement the Project including all aspects of operational management, coordination with other initiatives and procurement of services and supplies in collaboration with the Project Coordination Unit (PCU) at MOE. In addition, the PMU will undertake regular reviews of the Risk and Issues Logs and provide feedback to the Project Board regarding technical issues and social/environmental risks. The PMU will be composed of full time and part-time qualified staff and their costs will be charged to the project's budget for the time spent directly attributable to the implementation of the Action as described here below. . The PMU will be comprised by the following members:

- **Programme Specialist** – The specialist will support the Project as needed, including through annual supervision missions. The annual supervision missions will take place according to the schedule outlined in the annual work plan. Supervision mission reports will be circulated to the project team and Project Board within one month of the mission. The UNDP-CO will initiate and organize key EU M&E activities including the annual reporting, the independent mid-term review, and the independent terminal evaluation. The UNDP-CO will also ensure that the standard UNDP and EU M&E requirements are fulfilled to the highest quality. The Specialist will devote around 100% of time to this project.
- **Programme Quality Assurance Officer** – The person will facilitate coordinating general project management aspects including corporate communication, reporting, quality assurance, liaising with PCU for effective and efficient project implementation. The Officer will dedicate 100% of time to the project and will report to the Programme Specialist.
- **Programme Analyst** – The person will support the Programme Specialist for Energy and Climate Change in coordinating the implementation of the project. The Analyst will devote 6% of the time for the project.
- **Programme Associate** – The person will handle all admin and Atlas project management aspects of the projects. The Associate will dedicate 6% of the time to the project.
- **Communications Analyst** – The person will lead and provide guidance on implementation of the Communication and visibility Plan within the scope of the project. She will provide high-quality communication guidance to the project in the production of mass-media, project briefs, stakeholders' engagement as well as liaising with national and international media to share project experience and strengthen knowledge management. The Analyst will dedicate 6% of the time to the project.
- **Programme Finance Associate** – The person will focus on financial management and procurement to ensure effective and efficient implementation of project. He/she will devote around 6% of his/her time to the project.
- **Procurement Associate** – The person will focus on procurement to ensure effective and efficient implementation of project activities. The Associate will devote around 6% of the time to the project.

The **Project Coordination Unit (PCU)** shall be established within MOE. The PCU will be an umbrella body that takes care of overall coordination of all Project actions. The PCU shall have its established roles, responsibilities, annual budget, and shall consist of the dedicated team whose members shall be from various departments within MOE, all to be appointed by the Permanent Secretary. A Project Focal Point shall be seconded by the MOE to lead the coordination work of the PCU working closely with the Project Manager and the Project Support Logistics/Administration expert. Both Project Manager and the Project Support Logistics/Administration expert will be recruited through UNDP. In building capacity, the PCU will be trained on various aspects of project management including partnership creation and management, communication, monitoring and reporting and programme data management, etc. The PCU will prepare its work plans and budgets on annual basis to support coordination functions. These documents shall be approved by the Project Board as part of overall project work plan based on the principles as set out in the Contribution Agreement between UNDP and EU. The PCU shall convene a project inception meeting with all Responsible Partners (i.e., TBS, NBS, DIT, TIRDO, EWURA, and PO-RALG) and other relevant stakeholders. Regular

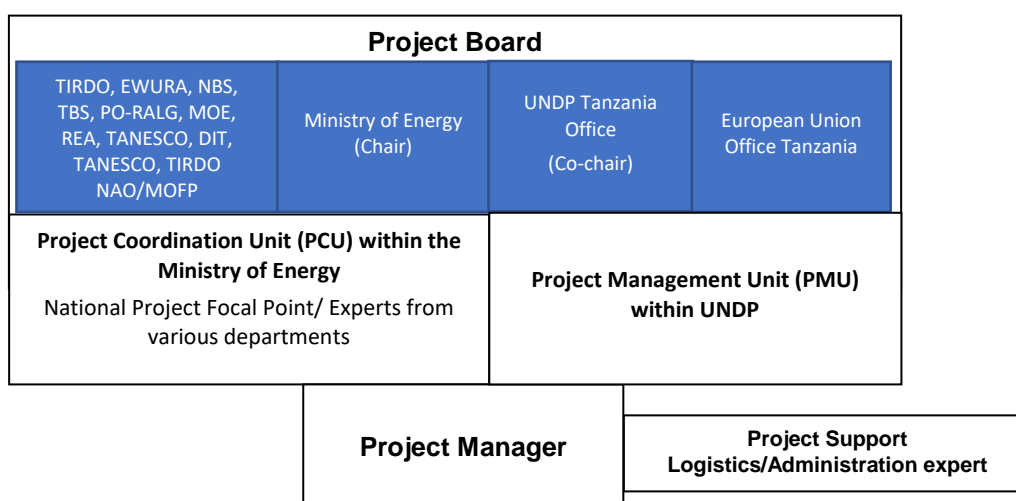


communication, meetings and co-ordination will be undertaken for effective stakeholders’ engagement throughout the project duration. Under the PMU guidance, specific quality assurance measures shall be undertaken by the PCU, which will include:

- Participate in quarterly discussions with PMU to agree the quality assurance elements connected to technical assistance inputs and to assess risks.
- Provide guidance to the Responsible Parties on the application of the “common approach” for social and environmental issues.
- Undertake regular missions, in consultation with PMU, to review the implementation of activities and risk management actions with the PMU and Responsible Partners.

To be embedded within the Ministry of Energy, the **Project Manager** will support the implementation of the Project in general and advise on the best opportunities for delivering Project’s outcomes and how the required investments can be made and managed to ensure maximum returns. The Manager will be responsible for the overall management of the Project and will work in close contact with Project’s implementation partners. The Project Manager will facilitate Project initiatives, coordinate agencies and institutions’ activities such as, but not limited to, Project implementation, feasibility studies, consumer and end-user research, work plan preparation and monitoring results. The Project Manager will be assisted by the **Project Logistics/Administration Expert**. Within each Responsible Partner institution, at least one **Technical Expert (TA)** will be embedded in the institutions to provide direct support in the implementation of specific Action. Several long-term and short-term international and national experts will be engaged to provide technical advisory services to MOE and other Responsible Partners. The duration of their engagement will be identified during the implementation of the project and based on the allocated budget. All experts will be recruited by UNDP following the established rules and regulations including those related to working hours and remunerations.

For general oversight, a **Project Board (PB)** shall be established by the Permanent Secretary of the Ministry of Energy. The Board will be comprised of one representative from each of the Responsible Party, one representative of each co-funder (EU and UNDP), and one representative from NAO/MOFP, TANESCO, REA, and EWURA. The Project Board meetings will be co-chaired by the Permanent Secretary in the Ministry of Energy and UNDP. MOE and UNDP will play a role of Secretariat. The Board shall meet at least twice annually. The basic function of the Project Board is to provide policy and strategic direction of the Project to safeguard performance and ensure quality control. The Board shall also review and endorse the work plans. The final composition of the Board will be confirmed once the programme is operational. The Project implementation arrangement is summarized in the Figure below.



Action 1 MOE	Action 2 TBS	Action 3 PO- RALG/EWURA	Action 4 NBS/EWURA	Action 5 TIRDO	Action 6 DIT	Action 7 MOE	Action 8 MOE/UNDP
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### **Project office/operation**

The office will be rented to accommodate the Project Manager, Project Logistics/Admin Officer, and the Technical Experts. The location of the office will be either in Dar es Salaam and/or Dodoma.. The project office maintenance costs will be charged to the project budget as direct costs charged in proportion to the actual use in line with the provisions of the General and Special Conditions of the Contribution Agreement. The costs will basically include office rental fees, maintenance and repair, consumables and supplies, IT and telecommunication services, energy and water office management including security fees.

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**IX. RISK MANAGEMENT**

The project will be implemented in line with UNDP’s programme and operations policies, rules, and regulations.

The Table below summarizes the expected risks/mitigation measures, and assumptions for the project.

<b>Risks</b>	
<b>Risk</b>	<b>Mitigation measure</b>
<b>1</b> Institutional risks: Changes in personnel etc., institutional restructuring	Co-creation, regular consultation, institutionalization of the process.
<b>2</b> Environmental/health risks: Delayed implementation and dynamics related to pandemics such as COVID-19	Contingent planning: flexible and ready to adapt to new ways of working using available tools and technologies, and business continuity measures
<b>3</b> Unavailability of required technology in the market:	New LTAs will be created in case there is no manufacturer in the current LTA list.
<b>Assumptions</b>	
<b>1</b>	Government’s commitment, ownership, interest/expectations, and support will be maintained
<b>2</b>	Acceptability and willingness of the government to institutionalize introduced actions/standards on energy efficiency
<b>3</b>	Willingness of the key beneficiaries to switch to new technologies
<b>4</b>	Localization and compatibility of imported technology
<b>5</b>	Timely approval processes within the government to allow for scheduled implementation

**Appendix I: Project Board Terms of Reference and TORs of key management positions****Terms of Reference for Project Board****Implementation of the Tanzania Energy Efficiency Action Plan****1. Introduction**

The Project Board (PB)<sup>4</sup> will be responsible for providing project assurance, in accordance with its Terms of Reference as described below. The board is responsible, through consensus, for taking management-related decisions when guidance is required by the Project Manager, including the provision of recommendations for approval by the IP and UNDP of project plans and revisions, and addressing project level grievances.

As per standard UNDP standard procedures, the composition of the PB will reflect its key stakeholders, including representation from the Implementing Partner (IP) and other Government agencies as required, relevant development partners such as bilateral agencies.

The PB for this project will be chaired by the MOE Permanent Secretary and co-chaired by the UNDP Resident Representative. The Secretariat for the board will be provided by the MOE and UNDP, who will nominate focal points to draft minutes of PB meetings. Upon review of draft minutes by the participants of the meeting and approval by the Chair and Co-Chair<sup>5</sup>, the Secretariat will be responsible for ensuring circulation among all targeted stakeholders. Government agencies participating in the PB are those that are most relevant to the coordinated success of the project. To ensure synergies, facilitate knowledge exchange, continued integration of good practices in project approaches through adaptive management actions, and identify opportunities for further co-financing.

The PB will indicatively comprise the following members<sup>6</sup> (to be reviewed in the first month of project implementation and confirmed prior to the Inception Workshop):

- 1) **Chair:** Ministry of energy (MOE) (Permanent Secretary)
- 2) **Co-Chair:** UNDP (Resident Representative)

**2. Members**

- 1). President's Office Regional Administration and Local Government Authorities (Permanent Secretary)
- 2). European Union Delegation
- 3). Tanzania Industrial Research Development Organization (TIRDO) (Chief Executive Officer)
- 4). Tanzania Electricity Supply Company (TANESCO) (Director General)
- 5). Dar es Salaam Institute of Technologies (DIT) (Principal)
- 6) Tanzania Revenue Authority (TRA) (Chief Executive Officer)
- 7) Tanzania Bureau of Standards (TBS) (Chief Executive Officer)
- 8) Energy and Water Utilities Regulatory Authority (EWURA) (Chief Executive Officer)

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<sup>4</sup> Also referred to as Project Steering Committee

<sup>5</sup> Draft board meeting minutes will be circulated by PCU within 2 working days for review by the meeting's participants, who will subsequently be given 3 working days for review and comments. Finalisation and approval of PB meeting minutes

<sup>6</sup> Representation in the Project Board is linked to institutions rather than individuals. Each institution bears responsibility to ensure adequate representation during meetings. This includes ensuring that the individual representing the institution is appropriately prepared. In case an institution is not represented during 3 out of 4 subsequent PB meetings, elimination from the board will result.

### 3. Responsibilities

The PB will ensure continued cohesion between the project and the mandate of the MOE. It will also provide additional linkages and interactions with high-level policy components within the Government. To ensure the ultimate accountability, decisions by the PB should be made in accordance with standards that shall ensure effective management for development results, best value for money, fairness, integrity, transparency, and effective international competition. In case of failure to reach consensus within the board, final decisions shall rest with the UNDP Resident Representative.

Specific responsibilities of the Project Board shall furthermore include:

- Provide overall guidance and direction to the project, ensuring it remains within any specified constraints.
- Address project issues as raised by its stakeholders.
- Provide guidance on project risks and agree on possible countermeasures and management actions to address identified risks.
- Review project progress, including appraisal and quality assessment rating as part of the annual project implementation report (PIR), and provide direction and adaptive management recommendations to ensure that agreed deliverables are produced satisfactorily according to annual work plans (AWPs).
- Provide ad hoc direction and advice for exceptional situations when the project manager's tolerances are exceeded.
- Assess and decide to proceed on project changes through appropriate revisions.

The Chair of the Project Board represents the ownership of the project by the Government of Tanzania. As part of the above-mentioned responsibilities for the Project Board, the Chair will be charged with ensuring the following key duties:

- Coherent project organization structure and logical set of plans.
- Setting of clear milestones in the AWP and other plans, as required for the Project Manager.
- Monitoring progress of the project at a strategic level and flagging risks to the timely achievement of its intended Outcomes and Objectives.
- Ensuring that risks are being tracked and mitigated as effectively as possible.
- Proactively briefing relevant stakeholders about project progress.
- Organizing and chairing Project Board meetings on a regular and timely basis<sup>7</sup>.

The core members of the PB represent the interests of parties that provide funding and/or technical expertise to the project, as well as project beneficiaries. Their primary function within the Board is to provide guidance regarding the technical feasibility of project activities. As part of the above-mentioned responsibilities for the Project Board, the core members will be charged with ensuring the following key duties:

- Progress towards the outputs remains consistent and technically sound.
- Specification of stakeholder and beneficiary's needs is accurate, complete, and unambiguous; and taken into account by the project to the extent possible and appropriate.
- Flag risks to the successful achievement of the intended Outcomes and Outputs of the project.
- Contribute informed opinions on whether to implement recommendations on proposed changes.

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<sup>7</sup> Project Board should meet at least once every quarter.

## Appendix II: Technical specifications for DIT laboratory

*(Provisional list new testing equipment for TIRDO. The final list of equipment to be determined during the implementation of the project. Adjustment will be made accordingly after approval by the Project Board.)*

### CLIMATE CHAMBER<sup>8</sup>

This device will be used to perform climatic and environmental analysis of building materials and energy consuming products.

- Temperature range: -40...180 C
- Useful capacity: 450...750 litres
- Temperature changing rate heating/cooling: 4.5/4.5 K/min
- Temperature fluctuation:  $\pm 0.1... \pm 0.3$
- Humidity range: 10...98%
- Temperature range for climatic test: 10...95 oC
- Maximum thermal load: 4500 W
- Inspection window
- UV lamp for ageing test
- Through holes for electrical, mechanical, and hydraulic connections inside and outside the chamber
- Automatic notification of event and alarms and specimen switching off in case of alarm
- Surface cleaning set
- Humidification water recycling system
- Chamber internal cloud for data storage
- PLC for managing all chamber's functions
- Archive manager for easy access for the stored measures and recordings
- Test program editor included
- Internal lighting
- Self-pivoting wheels and feet
- Embedded control software to manage, monitor and assist the chamber by Wi-Fi, Ethernet and mobile network and visualization and graphical analysis of measures and recordings (including live data)
- Installation support and training on site at DIT
- Online support for operation for at least 2 years

### 5 DIGITAL MANOMETERS

This is a device used for the measurement of static pressure, differential pressure, and gas pressure.

- Measurement range: -150... 150 mbar
- The device should allow to send the results to a printer (via an infrared interface) and/or wirelessly to smartphone App (via Wi-Fi interface)
- Eight user-selectable pressure scale measurement units
- For static pressure measurements, the resolution mode should be at least 0.01 mbar

### BLOWER DOOR

This device is used to measure the airtightness of residential and small commercial buildings.

- The device should be equipped with mounting frame, digital manometer, fan, connectors, software for airtightness data analysis, speed controller, calibration certificate, pipes kit
- Fan power max: 7830 m<sup>3</sup>/h at 50 Pa
- Max weight: 20 kg
- ISO 9972, EN 13829

### DUCT LEAKAGE TEST

This device detects leaking in ducts for air conditioning system in both houses and light commercial buildings. The duct fan should be connected directly to the duct system to diagnose losses and estimate efficiency.

- The device should automatically calculate leakage in real time, display both flow leakage rate and static pressure
- The device should be carrying weight (max 65 kg)
- Accuracy:  $\pm 2.5\%$  of volume flow
- EN12237 and EN1507

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<sup>8</sup> Indicative prices in these technical specifications does not include shipping, custom charges and taxes.

### 3 PORTABLE THERMOGRAPHIC CAMERAS

This device is a particular camera, sensitive to infrared radiation, capable of obtaining images or thermographic shots. Temperature maps of the exposed surfaces are obtained.

- Object temperature range: -25...380°C
- Accuracy:  $\pm 1.5^{\circ}\text{C}$  for temperatures 50...100°C; up to  $\pm 3^{\circ}\text{C}$  for -25...50°C and 100°C...380°C
- Detector type: Focal Plane Array (FPA), uncooled microbolometer
- Dual pointer lasers
- IR resolution: 160 × 120 pixels
- Thermal Sensitivity/NETD <70 mK
- Store images and data with removable micro-SD card
- Mini USB Port for downloading images and charging internal battery

### 5 MOISTURE METERS

This device is used to measure the amount of water in the different materials, such as wood, concrete, cork and plaster.

- The device should be nondestructive and equipped with a pin, LCD display and an alarm function if the threshold level is exceeded
- Max penetration depth: 40 mm.
- Operating temperature: 0...50 °C

### 5 NON-CONTACT VOLTAGE DETECTORS

This device safely checks for electrical current in a wire, outlet or switch. The voltage detection is showed by a red LED light and an alarm sounds.

- The device should be equipped with automatic shut-off
- The device should be equipped with CAT IV 1000 Volt safety rating and conform to CE requirements
- The design should be lightweight, compact, and durable
- Voltage operating range: 50...1,000 V AC

### 5 LASER DISTANCE METERS

This device measures the distance of an object or span without contact by way of a laser.

- Measurement range: 0.1-120 m
- Measurement accuracy:  $\pm 2.0$  mm
- Laser class: 2
- IP65
- Memory capacity: 100 measurements
- **The device should be able to perform 3D measuring from point to point**
- The device should be equipped with touchscreen navigation, Bluetooth, free mobile app, auto switch-off, area/volume measurement, tilt measurement
- Memory capacity: 50 measurements
- Operating temperature: 0...40 °C

### 2 ELECTRONIC DISTANCE MEASURING WHEELS

An Electronic Distance Measuring Wheels allows to measure long distances while walking.

- The device should be folded for easy storage and transport and equipped with pistol grip brake, belt driven counter and automatic shut-off
- The counter should be digital with following units of measure: feet, feet/inches, feet/tenths, meters, meters/centimetres, meters/decimetres, yard, yards/inches
- Range: 4,000 m
- Extended length: 0,9 meters

### 30 HARD HATS WITH LED LIGHTING

The hard hat with LED lighting will be used for security and safety protection during the visit to in construction work areas, factories, industrial facilities.

- The hats should be equipped with ventilation holes, at least 6 points of webbing suspension and should be adjustable and realized in hard materials
- Chin strap should be included
- The had should be equipped with LED lighting for guaranteeing illumination in dark indoor
- CE EN397

### 2 PORTABLE TELESCOPING LADDERS

The portable telescoping ladder is a ladder capable of sliding inward or outward.

- The telescoping ladder should be equipped with a stabilizer bar, non-slip mat, one-button retraction
- Material should be aluminium
- The maximum weight capacity should be at least 150 kg
- The full length should be at least 4 m

#### **PORTABLE ELECTRICAL NETWORK ANALYZERS WITH DATA LOGGER**

This set of portable equipment, equipped with data logger, will be used to measure different parameters of the power transported to user devices and the electricity consumption of individual equipment.

- Measured parameters: voltage, current, frequency, THD V, THD A, power, power factor, fundamental power, DPF, energy
- 3 phases asynchronous
- Power consumption max 50 VA
- Number of inputs: 4
- IEC 61000-4-30: 2015
- Motor frequency range: 40Hz-70Hz
- Range mechanical motor: 0.7 kW-746 kW
- Averaging interval: 1, 5, 10, 30 sec, 1, 5, 10, 15, 30 min.
- Voltage range 10-240 V using standard power cord
- Logger function for long-term recording of minimum, maximum and average readings for up to 150 parameters on all three phases and neutral
- USB port and cable to transfer data to a PC for trend and waveform data analysis with software included
- Online training for operation

#### **5 DIGITAL LUX METERS**

This device is used to measure the luminance (luminous intensity per unit area of light travelling in a given direction).

- The device should be equipped with an internal data logger to record and save measurements, auto power off and carry bag.
- LCD backlit display, 4 digits
- Measuring range: 0...400,000 Lux
- Detector: Silicon photodiode with filter
- Accuracy:  $\pm 3\%$
- Protection: CE

#### **5 PORTABLE DIGITAL MULTIMETERS**

This tool will be used to measure following electrical values: voltage, current and resistance.

- The device should be equipped with an auto power off, PC interface, USB interface and a carry bag
- Maximum voltage (AC and DC): 1,000 V
- Maximum current (AC and DC): 40 A
- Maximum resistance: 50 M $\Omega$
- True-RMS
- Counts: 50,000
- Digits: 4-1/2

#### **5 DIGITAL TACHOMETERS**

The digital tachometer is a device to measure speed of rotation equipment with no contact and it is used by engineers and maintenance professionals.

- Rotational speed range: 1...99,999 rpm
- Measure distance: 50...250 mm
- Automatic shot-off: 30 s
- The device should be equipped by an on-board data-logging and software for statistical analysis
- LCD display backlit
- MAX, MIN, AVG

#### **PORTABLE STROBOSCOPES**

This device measure running speed of rotating equipment (hears, fans, centrifuges, motors, etc.) without stopping the operation and contact with machinery.

- Measurement range: 30...300,000 FPM
- Accuracy: 0.02%



- Operating temperature: 0...45 °C
- LCD display, 5 digits
- No external calibration process required
- Max weight: 2 kg
- Flash tube with plug and socket easy to replace
- CE, IEC1010

#### **5 DIGITAL ROOM THERMOMETERS AND HYGROMETERS**

A Digital Room Thermometer and Hygrometer provides accurate indoor humidity and temperature measurements.

- Temperature range: -15...50°C
- The device should be equipped with a realtime temperature and humidity LCD Display and low battery indicator.
- The temperature should be switched to/from Fahrenheit degree to/from Celsius degree
- Humidity range: 10...99%
- Temperature resolution: 0.1°C
- Humidity resolution: 1%

#### **AIR FLOW METER**

This device will be used to measure air flow and velocity in industrial facilities.

- Air pressure range: 0...4000 Pascal
- Air velocity range: 250...16,000 fpm
- Air flow volume range: 0...99,999 cfm
- Operating temperature range: 0...50 °C
- Maximum pressure at each port: 10 psi
- IP40, EN61326-1

#### **PORTABLE ULTRASONIC FLOWMETER**

This device is used for liquid metering into pipes. Measurement parameters are velocity, volume, mass, total flow.

- Temperature range: -40 °C ...170 °C C
- Cable length more than 10 m
- Pipe size range: 0.5" to 394"
- Flow range: bidirectional
- The device should be equipped with tablet with LCD capacitive touchscreen, Bluetooth technology, carry case, battery Lithium Ion, USB key (at least 1 GB of capacity)
- Protection IP40

#### **COMBUSTION ANALYSER**

This instrument calculates the efficiency of boilers, heaters, and furnaces by measuring parameters such as stack temperature, flue pressure and levels of gases.

- At least 4 cells (O<sub>2</sub>, CO, Nox, SO<sub>2</sub>).
- Portable.
- Integrated printer
- Sensor at least 300 mm long
- Carry case.
- EN 50379-1, EN 50379-2
- **The** memory capacity should be at least 500 measurements
- Batteries Lithium Ion

#### **5 PORTABLE DIGITAL INFRARED THERMOMETERS GUNS**

This tool is used to deliver readings of surface temperatures of objects from distance.

- Temperature range at least -30... 500 oC
- Distance to spot ratio: 12:1
- Hi-Lo alarm included
- Emissivity: 0.95

#### **5 DIGITAL TDS METERS**

The device is a professional grade level meter for water quality testing: electrical conductivity (EC), total dissolved solids (TDS), salinity and temperature.

- IP-67 rating

- The device should be equipped with auto-off function, data-hold function, low-battery indicator and LCD screen
- EC range: 0...9.99 mS
- TDS range: 0...8000 ppm (0.7 Scale); 0...5000 ppm (0.5 Scale)
- Operating temperature range: 0...50 °C
- Resolution: 0...99: 0.01mS/ppt; 100...999: 1 µS/ppm; 1000...9990: 10 µS/ppm; temperature resolution: 0.1 °C
- Digital calibration (push button) to any point within the meter's range
- Accuracy: ± 2%

## 5 CIRCUIT LOAD TESTERS

This device checks for circuit and wiring problems, ground impedance and missing ground fault protection.

- The device should allow the selection of at least three loads, measure loaded and unloaded AC line voltage, calculate and displays the percentage of voltage drop and line impedance, display peak voltage and frequency
- AC test cord included
- LCD display

## 5 ELECTRICAL OUTLET TESTERS

An Electrical Outlet Tester is a device used to check supply faults and incorrect wiring and socket outlets.

- 3 Phase Industrial Socket Testers, neutral/Earth check
- Input voltage range: 380...415V AC (Phase to Phase)
- Input frequency: 50Hz
- Input current: < 20mA
- BS EN 61326-1, BS EN 61010-1, CAT III 300V, Class II Double Insulation, Pollution Degree: 2

## ULTRASONIC LEAK DETECTOR FOR COMPRESSED AIR INSTALLATIONS

Including: leak detector, headset with neck, flexible ultrasonic probe, batteries, USB cable, operating software

- Measuring range: -6 à 99,9 dBµV (reference 0 dB = 1 µV)
- Resolution: 0,1 dBµV
- Bandwidth: 35 à 42 kHz
- Signal amplification: +30 to +102 in 6 dB steps
- Amplification: 5 positions adjustable in 6 dB steps
- Maximum power: +83 dB SPL with the helmet supplied
- NRR Peltor HQ 25 dB headphones
- Headphone connector: 6.35 mm stereo jack connector

## 5 COOLANT TEMPERATURE AND FLOW INDICATOR

A coolant temperature and flow indicator detects coolant temperatures.

- Temperature range: 0... 99 C.
- The LCD screen displays the value in degrees Celsius or Fahrenheit
- Thread: G1 / 4
- The device must be equipped with temperature warning and low flow warning functions

## 2 GLOBE THERMOMETER (TC TYPE K) - FOR RADIANT HEAT

The globe thermometer is suitable for measuring radiant heat, e.g. as part of the measurement of well-being at the workplace.

- To measure radiant heat according to ISO 7243, ISO 7726, DIN EN 27726 and DIN 33403 standards
- Type K thermocouple
- With stand and mounting ring
- Measuring range: 0 to + 120 ° C

## 30 SAFETY VESTS

- 100% polyester
- high visibility of reflective material
- washable and durable
- At least 7 pockets
- Compliance with EN ISO 20471 class 2 standards
- Indicative unit price: 10 EUR

## 5 DIGITAL CALIPERS

Precision measurement of cable cross-section and size of leaks.

- Range: 0 to 6" x 0.0005"
- Resolution: 0 to 150 mm x 0.01mm
- IP65
- Minimal dimensions: 235 x 75 x 15mm

### 5 CURRENT CLAMP (AC / DC) (1000 A)

Non-contact voltage detector to measures: voltage and current, capacitance, active and apparent power, the power factor and frequency

- Min / Max function
- Hold reading function
- Peak value holding function
- Automatic or manual calibration
- USB interface
- Voltage (AC / DC): 1000 V
- Current (AC / DC): 1000 A
- Resistance: 4MΩ
- Capacity: 40mF

### 5 CURRENT CLAMP (AC / DC) (200 A)

Non-contact voltage detector to measures: voltage and current, capacitance, active and apparent power, the power factor and frequency

- Min / Max function
- Hold reading function
- Peak value holding function
- Automatic or manual calibration
- USB interface
- Voltage (AC / DC): 600 V
- Current (AC / DC): 200 A
- Resistance: 4MΩ
- Capacity: 40mF

### 5 DATA LOGGER VOLTAGE AND CURRENT

This device simultaneously measures 2 AC voltage inputs or 2 AC current inputs or 1 AC voltage and 1 AC current input.

- Max / Min readings
- Maintain peak value
- Programmable sampling frequencies
- Downloadable collected data via the USB interface
- Download measurements via USB interface and analyze results with included software
- Includes AC clamp sensor and voltage sensor
- Current range: 10...200A
- Accuracy:  $\pm$  (2% of reading  $\pm$  1A)
- Resolution : 0.1A
- Voltage range: 10...600V
- Accuracy:  $\pm$  (2% of reading  $\pm$  1A)
- Resolution : 0.1V
- Selectable sampling rate : 1 sec... 24 h
- Dual channel, TRMS AC Voltage or Current
- Operating temperature range: 0... 50 oC
- Operating humidity range: 10...75%
- Max datapoints: at least 250,000
- Product certification: CE
- Overvoltage categorie: CAT. III 600V

### 2 HEAT FLOW SENSOR

This device measures thermal resistance (R value) and thermal transmittance (H value)

- Sensitivity: 60  $\mu$ V / (W / m<sup>2</sup>)
- Range: + -2000 W / m<sup>2</sup>

- Temperature range: -30... 70 °C
- Cable: 5 m

### PHOTOVOLTAIC SIMULATION SOFTWARE

Software program for the dynamic simulation, desing and dimension with 3D visualization and detailed shading analysis of photovoltaic plants with storage systems.

- Import of satellite maps
- High and low tariffs taken into account
- Languages: English, French, German, Italian, Polish, Portuguese, Spanish (plus additional languages for the results presentation)
- Calculation of electric vehicles with battery storage systems
- Online training and support (in English).
- Use on tablets and phones (iOS, Android, Windows).
- New versions included.
- Compatible with Windows 10 Pro.
- At least four academic/educational unlimited licences

### SOLAR THERMAL SIMULATION SOFTWARE

Software program for design, calculation, and optimization of solar thermal systems.

- Dynamic simulation
- User-friendly interface
- Online training and support (in English).
- Use on tablets and phones (iOS, Android, Windows).
- New versions included.
- Compatible with Windows 10 Pro.
- At least four academic/educational unlimited licences

### 3 DESKTOP COMPUTERS

- OS: MS Windows 10 Pro (or equivalent)
- Processor: 2.4 GHz Intel Core i7-8700T 8-core
- Memory: 16GB
- Storage: 2TB
- Software: MS Office Business (or equivalent) with perpetual license
- Wireless mouse
- Wireless keyboard
- Monitor: at least 27-inch (diagonal)

### 3 LAPTOP COMPUTERS

- OS: Mac OS Mojave (or equivalent)
- Processor: 2.4 GHz quad-core Intel Core i7 processor with 128MB of eDRAM
- Memory: 16 GB
- Storage: 2TB
- Software: Ms Office 2019 Business (or equivalent) with perpetual license
- Monitor: at least 13-inch (diagonal)

### ENERGY SOFTWARE FOR ENERGY BUILDING SIMULATION AND AUDITING

Software allowing to dynamically model the thermal behavior of buildings which includes 3D modelling and import functionality of DXF, CAD, and 3D files.

- Facilities to be audited will include office space, multifamily and apartment buildings, hotels, schools and universities, hospitals, military barracks
- Energy data analysis and dynamic simulation (**energy requirements, losses, and consumptions**) at least for: lighting, HVAC (heating, ventilation, and air conditioning), building envelope (including thermal bridges), **electricity requirements** for elevators and escalators
- Energy performance calculation for central heating or autonomous heating units' buildings of at least: winter heating, domestic hot water production, summer air conditioning, ventilation, lighting, and transport
- Technologies included: fossil fuel, biomass generators, solar thermal, photovoltaic, geothermal, electric and gas heat pumps, district heating and small cogeneration
- Hourly energy simulation of building

- Climatic data included
- Database and libraries of generators and materials included (the database can be further expanded by the user)
- Exports of IFC file and generation of **BIM Model**
- Energy audit reporting realization
- Cost-benefit ratio of **energy retrofit actions**, estimate of fuel saving and CO2 emission reduction realization
- Online training and support (in English)
- Use on tablets and phones (iOS, Android, Windows)
- Energy building model with the import of **DXF-DWG files** and BIM-IFC models from CAD BIM
- Import file format XLS and CSV
- Compatible with Windows 10 Pro
- New releases included
- Climate data of Tanzania already included or possibility to import Tanzania climate data in CSV or EPW file formats
- Energy simulation based on EN ISO 52016
- At least four academic/educational unlimited licences

#### **ENERGY SOFTWARE FOR ENERGY AUDITING IN INDUSTRIES**

Software to perform energy data analysis of buildings, dynamic simulations and diagnostic audits of buildings.

- Analysis of energy data and dynamic simulation (energy needs, losses and consumption) at least for: heat production, hot water and steam; industrial cold, cogeneration and trigeneration; compressed air production.
- Technologies included: fossil fuels, biomass generators, solar thermal, photovoltaic, geothermal, electric and gas pumps, district heating and small cogeneration.
- Database and libraries of generators and materials included (the database can be developed by the user).
- Production of technical energy audit reports.
- Cost-effectiveness of energy renovation actions, estimation of fuel savings and reduction of CO2 emissions.
- Online training and support (in English).
- Use on tablets and phones (iOS, Android, Windows).
- New versions included.
- Compatible with Windows 10 Pro.
- Tanzania climate data already included or possibility of importing Tanzania climate data in CSV or EPW file format.
- At least four academic/educational unlimited licences

#### **ENERGY SOFTWARE FOR ENERGY MANAGEMENT**

Software for the energy management of organizations: management and control of energy costs; control of the efficiency of energy equipment; optimization of bills and energy consumption.

- Technologies considered: fossil fuels, biomass generators, solar thermal, photovoltaic, geothermal, electric and gas pumps, district heating and small cogeneration.
- Database and libraries of generators and materials included (the database can be developed by the user).
- Production of technical reports.
- Online training and support (in English).
- Use on tablets and phones (iOS, Android, Windows).
- New versions included.
- Compatible with Windows 10 Pro.
- Tanzania climate data already included or possibility of importing Tanzania climate data in CSV or EPW file format.
- At least four academic/educational unlimited licences

#### **MULTIMEDIA PROJECTOR**

This device is a compact, high resolution, full-color projector capable of projecting text, images, video and audio content in classrooms, offices and conference rooms. The projector features inputs from a computer, DVD player, mobile devices, CD player.

- 3-chip, 3LCD technology
- Native resolution: 1080p+/WUXGA
- Wireless, Miracast, MHL
- Color and White Brightness: 3600 lumen
- HDMI: 2 port
- Vertical Keystone: auto
- Horizontal Keystone: manual, easy slide correction
- Compatible with Windows 10 Pro Operating System
- Indicative price: EUR 1,500

### **5 PRINTERS ALL IN ONE (PRINT, COPY AND SCAN)**

Compact office device to print, copy and scan.

- Print size: A4
- Print speed: at least 30 ppm
- Printer technology: laser
- Printer output: monochrome
- Connectivity technology: USB 2.0, Wi-Fi Direct, Google Cloud Print, Apple AirPrint mobile printing
- Compatible with Windows 10 Pro Operating System and
- Weight: less than 10 kg
- Print resolution: up to 1200 x 1200 dpi
- Duplex printing: manual

### **COPIER MACHINE**

- Number of trays: 2
- Maximum print speed: at least 45 ppm b/w and color
- Print resolution: up to 1200 x 1200 dpi
- Paper size: up to 12 x 18 in. (SRA3)
- Paper capacity: 1,200 sheets
- Duplex: yes
  - Further functionality: Standard: print, scan and fax
- Connectivity: Ethernet, USB, wireless

### **15 TABLES FOR STUDENTS**

Worktable for two students seated next to each other.

- Material: wood
- Overall height: 30"
- Shape: rectangle

### **30 CHAIRS FOR STUDENTS**

- Total height: at least 80 cm
- Total width: at least 62 cm
- Total depth: at least 70 cm
- Seat height: at least 46 cm
- Maximum load capacity: at least 120 kg
- Frame material: metal

## Appendix III. Technical Specifications for TIRDO

*(Provisional list new testing equipment for TIRDO. The final list of equipment to be determined during the implementation of the project. Adjustment will be made accordingly after approval by the Project Board.)*

### COMBUSTION ANALYZER<sup>9</sup>

This instrument calculates the efficiency of boilers, heaters and furnaces by measuring parameters such as stack temperature, flue pressure and levels of gases.

- At least 4 cells (O<sub>2</sub>, CO, NO<sub>x</sub>, SO<sub>2</sub>).
- Portable
- Integrated printer
- Sensor at least 300 mm long
- Carry case
- EN 50379-1, EN 50379-2
- **The** memory capacity should be at least 500 measurements
- Batteries Lithium Ion

### PORTABLE ULTRASONIC FLOWMETER

- This device is used for liquid metering into pipes. Measurement parameters are velocity, volume, mass, total flow.
- Temperature range: -40 °C...170 °C
- Cable length more than 10 m
- Pipe size range: 0.5" to 394"
- Flow range: bidirectional
- The device should be equipped with tablet with LCD capacitive touchscreen, Bluetooth technology, carry case, battery Lithium Ion, USB key (at least 1 GB of capacity)
- Protection IP40

### PORTABLE ELECTRICAL NETWORK ANALYZERS WITH DATA LOGGER

This set of portable equipment, equipped with data logger, will be used to measure different parameters of power transported and electricity consumption of at least 10 individual devices (in industries and buildings).

- Measured parameters: voltage, current, frequency, THD V, THD A, power, power factor, fundamental power, DPF, energy
- 3-phase asynchronous
- Power consumption max 50 VA
- Number of inputs: 4
- IEC 61000-4-30:2015
- Motor frequency range: 40Hz-70Hz
- Range mechanical motor: 0.7 kW-746 kW
- Averaging interval: 1, 5, 10, 30 sec, 1, 5, 10, 15, 30 min.
- Voltage range 10-240 V using standard power cord
- Logger function for long-term recording of minimum, maximum and average readings for up to 150 parameters on all three phases and neutral
- USB port and cable to transfer data to a PC for trend and waveform data analysis with software included
- Software for the configuration of multiple devices simultaneously, including visualization dashboards with real time data to detect potential wiring or configuration errors
- Webview software to deliver real-time monitoring, breakdown of energy consumption, alarm management by e-mail, multi-utility analysis (electricity, water, gas), power parameter logging and allocation of consumption by end-use and location (at least 200 devices)
- Online training for installation and operation

### 2 PORTABLE HEAT FLUX SENSORS

This tool serves to measure the heat flux flow through the object in which it is incorporated or mounted upon, in soil, through walls and building envelopes. It employs a passive thermopile detector that generates a millivolt output signal.

- Parameters to measure: thermal resistance (R-value) and thermal transmittance (H-value)
- Standards: ISO 9869, ASTM C1046, IP67
- Sensitivity: 60  $\mu\text{V}/(\text{W}/\text{m}^2)$
- Range:  $\pm 2000 \text{ W}/\text{m}^2$
- Temperature range: -30-70 °C
- Cable: 5 m

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<sup>9</sup> Except for vehicles, indicative prices in these technical specifications does not include shipping, custom charges and taxes.

### 3 PORTABLE THERMOGRAPHIC CAMERAS

This device is a particular camera, sensitive to infrared radiation, capable of obtaining images or thermographic shots. Temperature maps of the exposed surfaces are obtained.

- Object temperature range: -25...380°C
- Accuracy:  $\pm 1.5^{\circ}\text{C}$  for temperatures 50...100°C; up to  $\pm 3^{\circ}\text{C}$  for -25...50°C and 100°C...380°C
- Detector type: Focal Plane Array (FPA), uncooled microbolometer
- Dual pointer lasers
- IR resolution: 160 × 120 pixels
- Thermal Sensitivity/NETD <70 mK
- Store images and data with removable micro-SD card
- Mini USB Port for downloading images and charging internal battery

### 5 LASER DISTANCE METERS

This device measures the distance of an object or span without contact by way of a laser.

- Measurement range: 0.1-120 m
- Measurement accuracy:  $\pm 2.0$  mm
- Laser class: 2
- IP65
- Memory capacity: 100 measurements
- **The device should be able to perform 3D measuring from point to point**
- The device should be equipped with touchscreen navigation, Bluetooth, free mobile app, auto switch-off, area/volume measurement, tilt measurement

### 5 PORTABLE DIGITAL MULTIMETERS

This tool will be used to measure following electrical values: voltage, current and resistance.

- The device should be equipped with an auto power off, PC interface and a carry bug.
- Maximum voltage (AC and DC): 1,000 V
- Maximum current (AC and DC): 10 A
- Maximum resistance: 50 M $\Omega$
- True-RMS
- Counts: 50,000
- Digits: 4-1/2
- Indicative price: EUR 500

### 5 DIGITAL LUX METERS

This device is used to measure the luminance (luminous intensity per unit area of light travelling in a given direction).

- The device should be equipped with an internal data logger to record and save measurements, auto power off and carry bug.
- LCD backlit display, 4 digits
- Measuring range: 0...400,000 Lux
- Detector: Silicon photodiode with filter
- Accuracy:  $\pm 3\%$
- Protection: CE

### INDICATIVE PRICE: EUR 200 BLOWER DOORS

This device is used to measure the airtightness of residential and small commercial buildings.

- The device should be equipped with mounting frame, digital manometer, fan, connectors, software for airtightness data analysis, speed controller, calibration certificate, pipes kit.
- Fan power max: 7830 m<sup>3</sup>/h at 50 Pa
- Max weight: 20 kg
- ISO 9972, EN 13829

### 5 MOISTURE METERS

This device is used to measure the amount of water in the different materials, such as wood, concrete, cork, plaster.

- The device should be nondestructive and equipped with a pin, LCD display and an alarm function if the threshold level is exceeded
- Max penetration depth: 40 mm
- Operating temperature: 0-50 °C

### 5 DIGITAL MANOMETERS



This is a device used for the measurement of static pressure, differential pressure and gas pressure.

- Measurement range: -150... 150 mbar
- The device should allow to send the results to a printer (via an infrared interface) and/or wirelessly to smartphone App (via Wi-Fi interface)
- Eight user-selectable pressure scale measurement units
- For static pressure measurements, the resolution mode should be at least 0.01 mbar
- Indicative price: EUR 100

### **5 PORTABLE GAS LEAK DETECTORS**

This device is capable of detecting combustible and toxic gases in industrial facilities.

- The device should be capable of detecting at least following combustibles and gases: acetone, ammonia, carbon monoxide, butane, halon, petrol, hydrogen sulphide, propane, natural gas, methane, naphtha.
- Sensitivity: less than 50 ppm (methane)
- Sensor: solid state
- The response time should be less than 2 seconds (to 40% L.E.L.) and recovery time less than 4 seconds (from 40% L.E.L.)
- Operation range temperature: 0-50°C
- At least 4 indicator levels, from low to high concentration
- The device should be equipped with audible & visual alarm for operator safety and supplied with soft carry case

### **3 PORTABLE CORDLESS DRILLS**

This tool is used for drilling holes in wood, walls or other surfaces and driving screws. It is a power drill that works without a cord

- The tool should be brushless motor, at least 2 speed gearbox powered through li-ion battery, at least 18 V, comfort or ergonomic grip
- Maximum weight: 2,5 kg
- Maximum torque: more than 50 Nm
- A carrying case and a drill set should be included

### **5 NON-CONTACT VOLTAGE DETECTORS**

This device safely checks for electrical current in a wire, outlet or switch. The voltage detection is showed by a red LED light and an alarm sounds

- The device should be equipped with automatic shut-off
- The device should be equipped with CAT IV 1000 Volt safety rating and conform to CE requirements
- The design should be lightweight, compact and durable
- Voltage operating range: 50-1,000 V AC

### **2 ELECTRONIC DISTANCE MEASURING WHEELS**

An Electronic Distance Measuring Wheels allows to measure long distances while walking.

- The device should be folded for easy storage and transport and equipped with pistol grip brake, belt driven counter and automatic shut-off
- The counter should be digital with following units of measure: feet, feet/inches, feet/tenths, meters, meters/centimeters, meters/decimeters, yard, yards/inches
- Range: 4,000 m
- Extended length: 0,9 meters

### **PORTABLE STROBOSCOPE**

This device measure running speed of rotating equipment (hairs, fans, centrifuges, motors, etc.) without stopping the operation and contact with machinery.

- Measurement range: 30-300,000 FPM
- Accuracy: 0.02%
- Operating temperature: 0-45 °C
- LCD display, 5 digits
- No external calibration process required
- Max weight: 2 kg
- Flash tube with plug and socket easy to replace
- CE, IEC1010

### **AIR FLOW METER**

This device will be used to measure air flow and velocity in industrial facilities.

- Air pressure range: 0...4000 Pascal
- Air velocity range: 250...16,000 fpm
- Air flow volume range: 0...99,999 cfm

- Operating temperature range: 0-50 °C
- Maximum pressure at each port: 10 psi
- IP40, EN61326-1

#### **5 CIRCUIT LOAD TESTERS**

This device checks for circuit and wiring problems, ground impedance and missing ground fault protection.

- The device should allow the selection of at least three loads, measure loaded and unloaded AC line voltage, calculate and displays the percentage of voltage drop and line impedance, display peak voltage and frequency.
- AC test cord included
- LCD display

#### **DUCT LEAKAGE TEST**

This device detects leaking in ducts for air conditioning system in both houses and light commercial buildings. The duct fan should be connected directly to the duct system to diagnose losses and estimate efficiency.

- The device should automatically calculate leakage in real time, display both flow leakage rate and static pressure
- The device should carry weight (max 65 kg)
- Accuracy: +/- 2.5% of volume flow

#### **5 LASER DISTANCE METERS**

This device measures the distance of an object or span without contact by way of a laser.

- Measurement range: 0.1-120 m
- Measurement accuracy: ±2.0 mm
- Laser class: 2
- IP65
- Memory capacity: 100 measurements
- **The device should be able to perform 3D measuring from point to point.**
- The device should be equipped with touchscreen navigation, Bluetooth, free mobile app, auto switch-off, area/volume measurement, tilt measurement
- Memory capacity: 50 measurements
- Operating temperature: 0-40 °C

#### **30 HARD HATS WITH LED LIGHTING**

The hard hat with LED lighting will be used for security and safety protection during the visit to in construction work areas, factories, industrial facilities.

- The hats should be equipped with ventilation holes, at least 6 points of webbing suspension and should be adjustable and realized in hard materials
- Chin strap should be included
- The hat should be equipped with LED lighting
- CE EN397

#### **2 PORTABLE TELESCOPING LADDERS**

The portable telescoping ladder is a ladder capable of sliding inward or outward.

- The telescoping ladder should be equipped with a stabilizer bar, non-slip mat, one-button retraction
- Material should be aluminum
- The maximum weight capacity should be at least 150 kg
- The full length should be at least 4 m

#### **5 DIGITAL TACHOMETERS**

The digital tachometer is a device to measure speed of rotation equipment with no contact and it is used by engineers and maintenance professionals.

- Rotational speed range: 1...99,999 rpm
- Measure distance: 50...250 mm
- Automatic shut-off: 30 s
- The device should be equipped by an on-board data-logging and software for statistical analysis
- LCD display backlit
- MAX, MIN, AVG

#### **5 DIGITAL TDS METERS**

The device is a professional grade level meter for water quality testing: electrical conductivity (EC), total dissolved solids (TDS), salinity and temperature.

- IP-67 rating
- The device should be equipped with auto-off function, data-hold function, low-battery indicator and LCD screen

- EC range: 0...9.99 mS
- TDS range: 0...8000 ppm (0.7 Scale); 0...5000 ppm (0.5 Scale)
- Operating temperature range: 0...50 °C
- Resolution: 0...99: 0.01mS/ppt; 100...999: 1 µS/ppm; 1000...9990: 10 µS/ppm; temperature resolution: 0.1 °C
- Digital calibration (push button) to any point within the meter's range
- Accuracy: +/- 2%

### 5 ELECTRICAL OUTLET TESTERS

An Electrical Outlet Tester is a device used to check supply faults and incorrect wiring and socket outlets.

- 3 Phase Industrial Socket Testers, neutral/Earth check
- Input voltage range: 380...415V AC (Phase to Phase)
- Input frequency: 50Hz
- Input current: < 20mA
- BS EN 61326-1, BS EN 61010-1, CAT III 300V, Class II Double Insulation, Pollution Degree: 2

### 5 COOLANT TEMPERATURE AND FLOW INDICATORS

A Coolant Temperature and Flow Indicator detects coolant temperatures.

- Temperature ranging: 0-99 C
- LCD displays the value in unit Celsius or Fahrenheit degree
- Screw thread: G1/4
- The device should be equipped with temperature and low-flow warning alert functions

### 5 DIGITAL ROOM THERMOMETERS AND HYGROMETERS

A Digital Room Thermometer and Hygrometer provides accurate indoor humidity and temperature measurements.

- Temperature range: -15...50°C
- The device should be equipped with a real-time temperature and humidity LCD Display and low battery indicator
- The temperature should be switched to/from Fahrenheit degree to/from Celsius degree
- Humidity range: 10-99%
- Temperature resolution: 0.1°C
- Humidity resolution: 1%

### INDICATIVE PRICE: EUR 1505 FRESH WATER PRESSURE GAUGES

A Fresh Water Pressure Gauge measures water pressure in water systems and tests water flow.

- Pressure range: 0-1,000 Psi

### ULTRASONIC LEAK DETECTOR FOR COMPRESSED AIR INSTALLATIONS

Including: leak detector, headset with neck, flexible ultrasonic probe, batteries, USB cable, operating software

- Measuring range: -6 à 99,9 dBµV (reference 0 dB = 1 µV)
- Resolution: 0,1 dBµV
- Bandwith: 35 à 42 kHz
- Signal amplification: +30 to +102 in 6 dB steps
- Amplification: 5 positions adjustable in 6 dB steps
- Maximum power: +83 dB SPL with the helmet supplied
- NRR Peltor HQ 25 dB headphones
- Headphone connector: 6.35 mm stereo jack connector

### 3 COOLANT TEMPERATURE AND FLOW INDICATORS

A coolant temperature and flow indicator detect coolant temperatures.

- Temperature range: 0... 99 C
- The LCD screen displays the value in degrees Celsius or Fahrenheit
- Thread: G1 / 4
- The device must be equipped with temperature warning and low flow warning functions

### 2 GLOBE THERMOMETERS (TC TYPE K) - FOR RADIANT HEAT

The globe thermometer is suitable for measuring radiant heat, e.g., as part of the measurement of well-being at the workplace.

- To measure radiant heat according to ISO 7243, ISO 7726, DIN EN 27726 and DIN 33403 standards
- Type K thermocouple
- With stand and mounting ring
- Measuring range: 0 to + 120 ° C

### INDICATIVE UNIT PRICE: EUR 350 30 SAFETY VESTS

- 100% polyester
- high visibility of reflective material
- washable and durable
- At least 7 pockets
- Compliance with EN ISO 20471 class 2 standards

#### **5 DIGITAL CALIPERS**

Precision measurement of cable cross-section and size of leaks.

- Range: 0 to 6" x 0.0005"
- Resolution: 0 to 150 mm x 0.01mm
- IP65
- Minimal dimensions: 235 x 75 x 15mm

#### **5 CURRENT CLAMP (AC / DC) (1000 A)**

Non-contact voltage detector to measures: voltage and current, capacitance, active and apparent power, the power factor and frequency

- Min / Max function
- Hold reading function
- Peak value holding function
- Automatic or manual calibration
- USB interface
- Voltage (AC / DC): 1000 V
- Current (AC / DC): 1000 A
- Resistance: 4M $\Omega$
- Capacity: 40mF

#### **5 CURRENT CLAMP (AC / DC) (200 A)**

Non-contact voltage detector to measures: voltage and current, capacitance, active and apparent power, the power factor and frequency

- Min / Max function
- Hold reading function
- Peak value holding function
- Automatic or manual calibration
- USB interface
- Voltage (AC / DC): 600 V
- Current (AC / DC): 200 A
- Resistance: 4M $\Omega$
- Capacity: 40mF

#### **4 DATA LOGGER VOLTAGE AND CURRENT**

This device simultaneously measures 2 AC voltage inputs or 2 AC current inputs or 1 AC voltage and 1 AC current input.

- Max / Min readings
- Maintain peak value
- Programmable sampling frequencies
- Downloadable collected data via the USB interface
- Download measurements via USB interface and analyze results with included software
- Includes AC clamp sensor and voltage sensor
- Current range: 10...200A
- Accuracy:  $\pm$  (2% of reading  $\pm$  1A)
- Resolution : 0.1A
- Voltage range: 10...600V
- Accuracy:  $\pm$  (2% of reading  $\pm$  1A)
- Resolution : 0.1V
- Selectable sampling rate : 1 sec... 24 h
- Dual channel, TRMS AC Voltage or Current
- Operating temperature range: 0... 50  $^{\circ}$ C
- Operating humidity range: 10...75%
- Max datapoints: at least 250,000
- Product certification: CE
- Overvoltage categorie: CAT. III 600V

## 2 HEAT FLOW SENSORS

This device measures thermal resistance (R value) and thermal transmittance (H value)

- Sensitivity: 60  $\mu\text{V} / (\text{W} / \text{m}^2)$
- Range: + -2000  $\text{W} / \text{m}^2$
- Temperature range: -30... 70 °C
- Cable: 5 m

## PHOTOVOLTAIC SIMULATION SOFTWARE

Software program for the dynamic simulation, design and dimension with 3D visualization and detailed shading analysis of photovoltaic plants with storage systems.

- Import of satellite maps
- High and low tariffs taken into account
- Languages: English, French, German, Italian, Polish, Portuguese, Spanish (plus additional languages for the results presentation)
- Calculation of electric vehicles with battery storage systems
- Online training and support (in English)
- Use on tablets and phones (iOS, Android, Windows)
- New versions included
- Compatible with Windows 10 Pro.
- At least four academic/educational unlimited licences

## SOLAR THERMAL SIMULATION SOFTWARE

Software program for design, calculation and optimization of solar thermal systems.

- Dynamic simulation
- User-friendly interface
- Online training and support (in English)
- Use on tablets and phones (iOS, Android, Windows)
- New versions included
- Compatible with Windows 10 Pro
- At least four academic/educational unlimited licences

## ENERGY SOFTWARE FOR ENERGY BUILDING SIMULATION AND AUDITING

Software allowing to dynamically model the thermal behavior of buildings which includes 3D modeling and import functionality of DXF, CAD, and 3D files.

- Facilities to be audited will include - office space, multifamily and apartment buildings, hotels, schools and universities, hospitals, military barracks
- Energy data analysis and dynamic simulation (**energy requirements, losses and consumptions**) at least for: lighting, HVAC (heating, ventilation, and air conditioning), building envelope (including thermal bridges), **electricity requirements** for elevators and escalators
- Energy performance calculation for central heating or autonomous heating units buildings of at least: winter heating, domestic hot water production, summer air conditioning, ventilation, lighting and transport
- Technologies included: fossil fuel, biomass generators, solar thermal, photovoltaic, geothermal, electric and gas heat pumps, district heating and small cogeneration.
- Hourly energy simulation of building
- Climatic data included
- Database and libraries of generators and materials included (the database can be further expanded by the user)
- Exports of IFC file and generation of **BIM Model**
- Energy audit reporting realization
- Cost-benefit ratio of **energy retrofit actions**, estimate of fuel saving and CO<sub>2</sub> emission reduction realization
- Online training and support (in English)
- Use on tablets and phones (iOS, Android, Windows)
- Energy building model with the import of **DXF-DWG files** and BIM-IFC models from CAD BIM
- Import file format XLS and CSV
- Compatible with Windows 10 Pro
- New releases included
- Climate data of Tanzania already included or possibility to import Tanzania climate data in CSV or EPW file formats
- Energy simulation based on EN ISO 52016
- At least four academic/educational unlimited licences

## ENERGY SOFTWARE FOR ENERGY AUDITING IN INDUSTRIES

Software to perform energy data analysis of buildings, dynamic simulations and diagnostic audits of buildings.

- Analysis of energy data and dynamic simulation (energy needs, losses and consumption) at least for: heat production, hot water and steam; industrial cold, cogeneration and trigeneration; compressed air production
- Technologies included: fossil fuels, biomass generators, solar thermal, photovoltaic, geothermal, electric and gas pumps, district heating and small cogeneration.
- Database and libraries of generators and materials included (the database can be developed by the user)
  - Production of technical energy audit reports
- Cost-effectiveness of energy renovation actions, estimation of fuel savings and reduction of CO2 emissions
- Online training and support (in English)
- Use on tablets and phones (iOS, Android, Windows)
- New versions included
- Tanzania climatic data already included or possibility of importing Tanzania climatic data in CSV or EPW file format
- At least four academic/educational unlimited licences

#### **SOFTWARE FOR THE ENERGY MANAGEMENT OF ORGANIZATIONS**

- Management and control of energy costs, control of the efficiency of energy equipment, optimization of bills and energy consumption
- Technologies considered: fossil fuels, biomass generators, solar thermal, photovoltaic, geothermal, electric and gas pumps, district heating and small cogeneration
- Database and libraries of generators and materials included (the database can be developed by the user)
- Production of technical reports
- Online training and support (in English)
- Use on tablets and phones (iOS, Android, Windows)
- New versions included
- Tanzania climate data already included or possibility of importing Tanzania climate data in CSV or EPW file format
- At least four academic/educational unlimited licences

#### **5 DESKTOP COMPUTERS**

- OS: Windows 10 Pro (or equivalent), 64-bit with perpetual license, English
- Processor: 2.4 GHz Intel Core i7-8700T 6-core
- Memory: 8GB, 2666 MHz DDR4 Memory
- Storage: 2TB, 128GB SSD
- Software: MS Office Business with perpetual license (or equivalent)
- Wireless mouse
- Wireless keyboard
- Monitor: 27-inch (diagonal)
- Power: AC 230V AC, 50-60Hz

#### **1 LAPTOP COMPUTER**

- OS: Windows 10 Pro (or equivalent), 64-bit, English
- Processor: 10th Generation Intel® Core™ i7-10710U (12 MB Cache, 6 Core, up to 4.70 GHz)
- Memory: 16 GB, LPDDR3, 2133 MHz, Integrated
- Hard drive: 1 TB M.2 PCIe NVMe Solid-State Drive
- Monitor: 13.3-inch UHD (3840 x 2160) Infinity Edge Touch Display

#### **INDICATIVE PRICE: EUR 2,0001 MULTIMEDIA PROJECTOR**

This device is a compact, high resolution, full-color projector capable of projecting text, images, video and audio content in classrooms, offices and conference rooms. The projector features inputs from a computer, DVD player, mobile devices, CD player.

- 3-chip, 3LCD technology
- Native resolution: 1080p+/WUXGA
- Wireless, Miracast, MHL
- Color and White Brightness: 3600 lumen
- HDMI: 2 port
- Vertical Keystone: auto
- Horizontal Keystone: manual, easy slide correction
- Compatible with Windows 10 Pro
- Power: AC 230 V (50Hz)

#### **1 COPIER MACHINE ALL IN ONE (PRINTER, COPY, SCAN)**

- Functionalities: copy, print, scan
- Print processor: 800 MHz
- Interface: 9inch LCD touch panel

- Monthly duty cycle: 8,000 pages
- Number of trays: at least 2
- Maximum print speed A4: at least 22 ppm b/w and color
- Print resolution: up to 1200 x 1200 dpi
- Copier resolution: at least 600 dpi
- Maximum scanning resolution: at least 600 dpi
- Paper size: A3, A4, A5, A6, B4, B5, B6
- Print memory: at least 2 GB
- Copy warm-up time: less than 20 seconds
- Print Hard Disk Drive (HDD): at least 250 GB
- Connectivity technologies: USB 2.0, Wi-Fi Direct, Google Cloud Print, Apple AirPrint mobile printing, Ethernet
- Compatible with Windows 10 Pro
- 6 toners (3 color and 3 black)
- Power: AC 230 V (50 Hz)

#### **7 OFFICE CHAIRS**

- High back managers chair with adjustable arms and seat slider with titanium finish frames. Breathable progrid back with built-in lumbar support.
- 3 position locking 2-to-1 synchro tilt control and seat slider.
- Black fabric padded seat.
- Heavy duty nylon base with oversized dual wheel carpet casters.
- Dimensions: 27 x 26.5 x 43.5 inches

#### **7 OFFICES DESKTOP FOR COMPUTER WORSTATION**

- Material: wood
- Assembled dimensions: 24"D x 48"W x 29"H
- Locking CPU cabinet: 23.5"H x 14.5"W x 21"D
- Retractable keyboard: 22"W x 10.5"D

#### **5 COMMON OFFICE TABLES**

- Material: wood
- Shape: rectangle
- Assembled dimensions: at least 59.4 x 29.4 x 29.8 inches

#### **7 CABINETS**

- 5-8 drawers
- Dimensions (at least): 35"L x 21.25"W x 6" H
- Casters
- Material: Anti rust Metal

#### **5 STORAGE CUPBOARD FILING CABINET**

- Material: Antirust metal
- At least 4 layers
- Shelves 2-door and lock system
- Dimensions: 80 x 35 x 180 cm

#### **4 DEMONSTRATION BENCHES/TABLES**

- Material: anti rust metal
- Work surface material: damp proof finish
- Dimensions: approximately L (3m) x W (1.2m) x H (0.9m)
- Minimum number of power sockets: 4
- Number, type and placing of power sockets: Two phase
- Number, type and placing of gas outlets: One (provisional)
- Number, type and placing of water outlets: None
- Number, type and placing of lighting: None
- Number, type and placing and sink: None
- Number, type, placing and dimensions of drawers: standard, combination small/large (shall be indicated)
- Total space for benches installation in the room: two adjacent rooms each of 7m X 8m
- Certifications required: CE mark
- General safety requirements
- Laboratory door dimensions: W (1,5m) x H (2m)

- Description of the activities that will be performed on the benches: demonstration of EE equipment, setting the equipment and to perform some laboratory tests; drawers will stock equipment, consumables, and accessories.
- Position of the benches in the laboratory room: most to be placed on sides but possibility to centre in the other room will be ventured for accessibility to many trainees without compromising common space at centre.



## Appendix IV. Technical Specifications for the Ministry of Energy

*(Provisional list new testing equipment for Ministry of Energy. The final list of equipment to be determined during the implementation of the project. Adjustment will be made accordingly after approval by the Project Board.)*

### 4 DESKTOP COMPUTERS<sup>10</sup>

- Processor: 3.1GHz 6-core Intel Core i5
- Memory: 8GB Memory
- Storage: 1TB Fusion drive
- 100 – 240V AC, 50Hz to 60HZ
- UK electrical code
- MS Office Business (perpetual license) (or equivalent)
- Warrant at least 1 year
- Adapters (if needed): Thunderbolt 2, HDMI, DVI, and VGA
- Monitor: 27-inch (diagonal) 5K display

### 2 DESKTOP COMPUTERS

- Processor: 2.4GHz Intel Core i7-8700T 6-core
- Memory: 8GB, 2666 MHz DDR4 Memory
- Storage: 2TB, 128GB SSD
- Wireless mouse
- Wireless keyboard
- MS Windows 10 Pro (or equivalent), 64 bit with perpetual license
- MS Office Business with perpetual license (or equivalent)
- Monitor: 27-inch (diagonal)

### 4 LAPTOP COMPUTERS

- Processor: 2.4GHz
- Memory: 8GB
- Storage: 512GB SSD storage
- 100 – 240V AC, 50Hz to 60HZ
- UK electrical code
- MS Office Business (perpetual license) (or equivalent)
- At least four Thunderbolt 3 ports
- Adapters (if needed): Thunderbolt 2, HDMI
- Monitor: at least 13-inch

### 2 LAPTOP COMPUTERS

- Processor: 2.4GHz Intel Core i5 processor
- Memory: 8GB 2133MHz LPDDR3 memory
- Storage: 512GB SSD storage
- 100 – 240V AC, 50Hz to 60HZ
- UK electrical code
- MS Office Business (perpetual license) (or equivalent)
- At least four Thunderbolt 3 ports
- Adapters (if needed): Thunderbolt 2, HDMI
- Monitor: at least 13-inch

### SOFTWARE FOR PROFESSIONAL PLANNING AND TRACKING OF PROJECTS

- Project management software for project managers
- For the creation of construction schedules, plan marketing, advertising campaigns, coordinate product launches, develop projects in research and development
- Compatible with Mac
- Compatible with MS Office Project 2019
- At least 270 different task columns and 225 freely configurable resource columns
- 10 different licenses

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<sup>10</sup> Except for vehicles, indicative prices in these technical specifications does not include shipping, custom charges, and taxes.

#### **SOFTWARE FOR PROFESSIONAL PLANNING AND MANAGING OF PROJECTS, USING AN ORDERED LIST OF TASKS**

- Visually track project tasks, using out-of-box and custom task boards.
- Track and understand dates, assignments and the relationships of project tasks in visual timeline view.
- Work together with stakeholders and team members to edit and update task lists, project schedules, and more simultaneously.
- Use pre-built reports to track progress on projects, resources, programs and portfolios.
- Build visual, interactive roadmaps.
- Capture project and nonprojected time spent.
- Define the project team and request resources for the project
- Assign project tasks.
- Model different portfolio scenarios to determine the best strategic path.
- View and compare how resources are used across projects to optimize assignments.
- Compatible with Windows 10 Pro
- 2 different licences

## Appendix V. Technical Specifications for TBS

*(Provisional list new testing equipment for TBS based on the selected energy-consuming products and MEPS scheme adopted. The final list of equipment to be determined during the implementation of the project. Adjustment will be made accordingly after approval by the Project Board.)*

### PRODUCTS

#### Consumer products

- Air cleaners
- Battery chargers
- Boilers
- Ceiling fans
- Central air conditioners and heat pumps
- Clothes dryers
- Clothes washers
- Computer and battery backup systems
- Conventional cooking products
- Dehumidifiers
- Direct heating equipment
- Dishwashers
- External power supplies
- Furnace fans
- Furnaces
- Hearth products
- Manufactured housing
- Microwave ovens
- Miscellaneous refrigeration
- Pool heaters
- Portable air conditioners
- Refrigerators and freezers
- Room air conditioners
- Set-top boxes
- Televisions
- Water heaters

#### Commercial and industrial products

- air-cooled unitary air conditioners and heat pumps
- automatic commercial ice makers
- circulator pumps
- clothes washers
- commercial packaged boilers
- commercial and industrial air compressors
- computer room air conditioners
- dedicated outdoor air systems
- dedicated-purpose pool pumps
- distribution transformers
- electric motors
- evaporatively-cooled unitary air conditioners
- fans and blowers
- packaged terminal air conditioners and heat pumps
- pumps
- refrigerated beverage vending machines
- refrigeration equipment
- single package vertical air conditioners and heat pumps
- small electric motors
- unit heaters
- variable refrigerant flow air conditioners and heat pumps
- walk-in coolers and walk-in freezers

- warm air furnaces
- water-cooled unitary air conditioners
- water heating equipment
- water-source heat pumps

#### Lighting products

- ceiling fan light kits
- certain lamps
- compact fluorescent lamps
- fluorescent lamp ballasts
- general service fluorescent lamps
- general service incandescent lamps
- general service lamps
- high-intensity discharge lamps
- illuminated exit signs
- incandescent reflector lamps
- light emitting diode lamps
- luminaires
- metal halide lamp fixtures
- torchieres
- traffic signal modules and pedestrian modules

#### Plumbing products

- Commercial prerinse spray valves
- Faucets
- Showerheads
- Urinals
- Water closets (flush toilets)
- Other cross-cutting notices

#### EQUIPMENT

##### 1) Thermal Laboratory – Insulation for testing:

- Testing building insulation for thermal conductivity, dimensions, and compressive strength
- Testing building materials and industrial insulation, slabs, and pipe sections in the temperature 0 to 800 °C

##### The equipment

1. Two Guarded - Hot- Plate (GHP) apparatus for building insulation after EN 12667 and EN 12664
2. GHP for industrial insulation. (50 -800°C) after EN 12667
3. Three Guarded – End pipe sections Ø60, Ø89, Ø219 mm after EN ISO 8497

##### Capacity

The capacity of the laboratory:

- 200 pcs.  $\lambda_{10}$
- 45 pcs.  $\lambda_{\text{high-temperature}}$  slabs
- 45 pcs.  $\lambda_{\text{high-temperature}}$  for pipe sections per each of the 3 diameters
- Thermal conductivity 0,04 to 2 W/mK
- Scope of temperature: 0 to 800 °Cw

##### 2) Data Acquisition Software

- Data acquisition software used in numerous accredited test facilities

##### 3) Mechanical testing – Mortar, Clay, Masonry,

The mechanical laboratory in the centre of Masonry to test mortar for masonry. The following tests can be performed, among other things:

- Flexural (fm,t) and compression (fm) strength of mortar acc. to EN 1015-11
- Air content of fresh mortar acc. to EN 1015-7
- Consistence of fresh mortar (flow-value) acc. to EN 1015-3
- Compression strength (fb) of masonry units acc. to EN 772-1

- Net and gross dry density of masonry units acc. to EN 772-13
- Determination of dimensions acc. to EN 772-16
- Compression strength (fb) and E-modulus (E) of masonry acc. to EN 1052-1
- Flexural strength of head (fxk1) and bed joint (fxk2) acc. to EN 1052-2
- Initial shear strength (fvk0) of masonry acc. to EN 1052-3
- Bond strength (fxk1, fm,xk1) of masonry acc. to EN 1052-5

#### 4) Renewable energy

- Lab testing in the area renewable energy in the following categories: Biomass boilers, Wood burning stoves, Heat pumps, Solar energy, and Solid biofuel.
- Type testing of biomass boiler up to 500 kW in accordance with EN 303-5:2012
- Type testing of pellet burners up to 70 kW in accordance with EN 15270:2008
- Field test of biomass boilers from 200 – 1000 kW (with mobile laboratory) in accordance with EN 303-5:2012

#### 5) Solar Energy

- Outdoor testing of solar energy, including solar heating and solar electric (PV) systems. The equipment consists of pipe circuits, switchboard with meters, module test rigs and other testing facilities specially designed for testing of components and plants as well as carrying out projects and experiments. Other equipment includes a test kit for on-site measurements and quality control of solar PV systems.

#### 6) Heat pump

- Measuring efficiency, performance, and sound power level of a heat pump at the same time and at different climate conditions. Equipment consists of climate chambers and other state-of-the-art test facilities to test heat pumps with a capacity up to 40 kW.

#### 7) The Circuit Monitoring System (CMS)

- The Circuit Monitoring System (CMS) is an ultra-compact and high-performance multichannel measurement system for AC and DC branch monitoring. It represents a complete solution for monitoring electrical parameters in distribution panels, enabling power monitoring and energy efficiency analysis in buildings and critical power applications.
- This enlarges the portfolio of central units for energy and power circuit monitoring, providing the most comprehensive set of information on the system. Through the built-in web server, CMS-700 allows to identify potential savings related to energy consumption and to detect risky situations before they lead to service interruptions or load failures. This helps guarantee uninterrupted power supply and service to customers.
- The CMS sensors measure any kind of current - direct, alternating, or mixed - in a wide measuring range of up to 160A. The new open-core sensor generation, which represents an innovative and highly perceived quality solution, allows retrofitting of existing installation, and guarantees maximum flexibility and modularity.

#### 8) Energy Meters

- Energy consumption awareness is key to reduce energy costs and improve energy efficiency on your machines and electrical assets. Energy meters allow to identify areas for improvement and to generate benefits for owners, facility managers and users. They enable to run smarter buildings in a more energy and cost-efficient manner.

#### 9) Network Analysers and Mustimeters

- Energy efficiency, energy cost savings and improvement of power quality are certainly three main goals to achieve to run sustainable buildings and tracking electricity consumption is fast becoming a no-brainer for any business.
- Analysers and Mustimeters range of System pro M compact® includes a comprehensive offer of front panel and DIN-Rail devices designed to monitor when, where and how power and energy are consumed by measuring and analysing in real-time the main electrical parameters of the network and the power quality KPIs.

#### 10) Current transformers and Shunts

- If current in a circuit is too high to be applied directly to a measuring instrument, a current transformer is used to reduce the current accurately proportional to the current in the circuit, which can be conveniently connected to measuring and recording instruments.

## Appendix VI. Technical Specifications for PO-RALG

*(Provisional list of equipment for PO-RALG needed for the realization of the Certification and building certifiers database. The list may change based on the changes in specs and needs. Adjustment will be made accordingly after approval by the Project Board.)*

### 4 DESKTOP COMPUTERS<sup>11</sup>

- Processor: 3.1GHz 6-core Intel Core i5
- Memory: 8GB Memory
- Storage: 1TB Fusion drive
- 100 – 240V AC, 50Hz to 60HZ
- UK electrical code
- MS Office Business (perpetual license) (or equivalent)
- Warrant at least 1 year
- Adapters (if needed): Thunderbolt 2, HDMI, DVI, and VGA
- Monitor: 27-inch (diagonal) 5K display

### 2 DESKTOP COMPUTERS

- Processor: 2.4GHz Intel Core i7-8700T 6-core
- Memory: 8GB, 2666 MHz DDR4 Memory
- Storage: 2TB, 128GB SSD
- Wireless mouse
- Wireless keyboard
- MS Windows 10 Pro (or equivalent), 64 bit with perpetual license
- MS Office Business with perpetual license (or equivalent)
- Monitor: 27-inch (diagonal)

### 4 LAPTOP COMPUTERS

- Processor: 2.4GHz
- Memory: 8GB
- Storage: 512GB SSD storage
- 100 – 240V AC, 50Hz to 60HZ
- UK electrical code
- MS Office Business (perpetual license) (or equivalent)
- At least four Thunderbolt 3 ports
- Adapters (if needed): Thunderbolt 2, HDMI
- Monitor: at least 13-inch

### 2 LAPTOP COMPUTERS

- Processor: 2.4GHz Intel Core i5 processor
- Memory: 8GB 2133MHz LPDDR3 memory
- Storage: 512GB SSD storage
- 100 – 240V AC, 50Hz to 60HZ
- UK electrical code
- MS Office Business (perpetual license) (or equivalent)
- At least four Thunderbolt 3 ports
- Adapters (if needed): Thunderbolt 2, HDMI
- Monitor: at least 13-inch

### SOFTWARE FOR PROFESSIONAL PLANNING AND TRACKING OF PROJECTS

- Project management software for project managers
- For the creation of construction schedules, plan marketing, advertising campaigns, coordinate product launches, develop projects in research and development
- Compatible with Mac
- Compatible with MS Office Project 2019
- At least 270 different task columns and 225 freely configurable resource columns
- 10 different licenses

### SOFTWARE FOR PROFESSIONAL PLANNING AND MANAGING OF PROJECTS, USING AN ORDERED LIST OF TASKS

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<sup>11</sup> Except for vehicles, indicative prices in these technical specifications does not include shipping, custom charges, and taxes.

- Visually track project tasks, using out-of-box and custom task boards.
- Track and understand dates, assignments and the relationships of project tasks in visual timeline view.
- Work together with stakeholders and team members to edit and update task lists, project schedules, and more simultaneously.
- Use pre-built reports to track progress on projects, resources, programs and portfolios.
- Build visual, interactive roadmaps.
- Capture project and nonprojected time spent.
- Define the project team and request resources for the project
- Assign project tasks.
- Model different portfolio scenarios to determine the best strategic path.
- View and compare how resources are used across projects to optimize assignments.
- Compatible with Windows 10 Pro
- 2 different licences

## **Appendix VII. Technical Specifications for NBS**

No major equipment to be procured for NBS.

