

TERMS OF REFERENCE

PROJECT AFTER II

Training of Trainers sessions in Electrical technology at IPRC Karongi

Output 2: The training offer in the IPRC Karongi is strengthened and more attractive

Specific objective 2.1: The quality of vocational training provided in IPRCs is significantly raised

Estimated number of working days	124 days which may vary downward
Estimated period of face-to-face services	93 days which may vary downward

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I. CONTEXT / PROJECT

1. Context and justification of the need:

The Government of Rwanda and Agence Française de Développement (AFD) signed 5 years grant/loan agreements on 8th March 2023 to implement AFTER II Project (Appui à la Formation Technique et l'Emploi au Rwanda). AFTER II aims to improve technical and vocational education and learning conditions in order to strengthen the skills of youth in line with labor market requirements.

Project management will be provided by two contracting authorities: Rwanda Polytechnic (RP) for IPRC-related interventions, and Rwanda TV ET Board (RTB) for TVET schools-related interventions, through their respective Single Projects Implementation Unit (SPIU).

Expertise France will provide technical assistance to the project implementation. Short and long-term expertise are mobilized on the basis of a technical offer validated by AFD, with the agreement of the Rwandan party.

On RP side, the beneficiary institutions are IPRC Karongi and IPRC Kitabi located in Karongi and Nyamagabe Districts respectively. On the side of RTB, the beneficiary institutions are Muhororo and Cyanika TVET Schools located in Karongi and Nyamagabe Districts respectively.

2. Objectives of the Project:

The main objective of AFTER II project is to reinforce the employability of youth and increase the number of TVET students in Nyamagabe and Karongi districts.

AFTER II project is divided into 4 main components and 2 cross-cutting components:

- Component 1: The IPRC Kitabi and Karongi and TVET schools of Cyanika and Muhororo campuses are expanded, modernized and environmentally friendly
- Component 2: The training offer in the IPRC Kitabi and Karongi and TVET schools of Cyanika and Muhororo is strengthened and more attractive
- Component 3: The link between TVET providers and the private sector is strengthened, and employment and entrepreneurship support mechanisms are more efficient
- Component 4: The quality and leadership of RP and RTB as institutions in the TVET sector are reinforced
- Cross-cutting component 5: The TVET programs are more gender-responsive and inclusive and specifically address dropouts of the general education
- Cross-cutting component 6: Greening TVET – TVET programs provide youth with green skills and competencies for sustainable economic growth

3. Progress of the activity concerned by the ToR:

One of the program supported within the AFTER II project is Electrical technology offered at IPRC Karongi.

The process started by conducting a capacity building need assessment to the instructor of this department based on the curriculum developed by Rwanda Polytechnic.

Through this process, we have identified 9 training subjects to be offered by different experts whose profile have been identified in the ToR.

The training will focus on practical skills through Project based methodology and will be organized in different sessions based on the availability of the participants. The period will be from October 2024 to February 2028. An average of 3 training session per year will be offered.

Through these trainings, IPRC Karongi instructors will be skilled enough to deliver practical lessons to their students that will lead to the production of competent graduates based on the labor market requirement.

II. Objective and expected results of the mission

1. General objective:

The objective of the assignment is to reinforce the practical skills of ten (10) instructors from IPRC Karongi and other IPRC having the same program to upgrade their practical skills and enable them to improve the delivery of practical lessons based on the following modules:

Level 6	Level 7	Level 8
<ul style="list-style-type: none"> ▪ Programmable Logic Controller Technology 	<ul style="list-style-type: none"> ▪ Electrical Power System Automation And Protection 	<ul style="list-style-type: none"> ▪ Power System Stability Analysis (B-tech Level 8)
<ul style="list-style-type: none"> ▪ Pneumatics and Hydraulics Technology 	<ul style="list-style-type: none"> ▪ Automatic Control System Technology 	<ul style="list-style-type: none"> ▪ Power System Design
		<ul style="list-style-type: none"> ▪ Electrical Service Design for Buildings and Industries
		<ul style="list-style-type: none"> ▪ Power System Protection and Control
		<ul style="list-style-type: none"> ▪ Power System Equipment Installation

2. Specific objectives:

At the end of each training session mentioned in the table below, participants shall be able to perform the task mentioned in the expected outcome.

Training title	Expected outcome	Number of days for training	Days for preparation and reporting
1. Programmable Logic Controller Technology	1. Apply PLC fundamentals 2. Interpret, develop and debug PLC Ladder Logic Programs and use PLC programming software 3. Commission and maintain PLC systems	7	3
2. Pneumatics and Hydraulics Technology	1. Implement hydraulic and pneumatic automation systems. 2. Maintain hydraulic and pneumatic automation systems.	7	3

	3.Design and interpret industrial processes using GRAFCET (SFC)		
3. Electrical Power System Automation And Protection	1.Analyze automated electrical power system. 2.Monitor and operate automated electrical power system. 3.Maintain automated electrical power system.	7	3
4. Automatic Control System Technology	1.Describe and Represent a Control System 2.Model a control system 3.Analyze a control system performance	8	3
5. Power System Stability Analysis	1.Determine power system stability. 2.Apply power system protection fundamentals. 3.Perform power flow analysis.	18	5
6. Power System Design	1.Design a generating station 2.Design a substation 3.Design a power line	14	4
7. Electrical Service Design for Buildings and Industries	1.Determine load demand for building and industrial electrical services. 2.Size materials and equipment for building and industrial electrical services. 3.Elaborate building and industrial electrical services design documents.	9	3
8. Power System Protection and Control	1.Conduct preliminary power system protection and control activities. 2.Install power system protective and control schemes. 3.Perform power system protective and control equipment configuration, setting and testing.	14	4
9. Power System Equipment Installation	1.Conduct preliminary power system equipment installation activities. 2.Erect power system equipment. 3.Perform wiring and cabling of power system equipment.	9	3

3. Anticipated results

The following anticipated result are expected at the end of each training session that will be organised:

- IPRC Instructors will upgrade their hands-on skills on each subject trained
- IPRC Instructors will improve the teaching of practical lessons
- IPRC Instructors will gain knowledge and skills to operate different equipment that will be purchased under AFTER II project
- IPRC instructors will improve their knowledge and skills on the use of existing equipment
- The skills offered to students in electrical program will be enhanced through practical lesson
- Students will be familiar with the use of different equipment similar to equipment found in different industries

4. Description of the assignment

Expertise France is supporting Rwanda polytechnic in the AFTER II project implementation. In this framework, Expertise France will recruit individual experts/Company to support the delivery of training of trainers in Electrical technology for IPRC Karongi based on the RP curricula from level 6 to level 8 and organise field visit where needed. The methodology to be used during these training session is **project based learning**

Applicants are allowed to apply for one or more training sessions based on their expertise. They should clearly indicate in the application letter which training they are applying for.

The expert to deliver the training will work under the supervision of the Component manager at Expertise France.

5. Place, duration and terms of performance

- Implementation period:** October 2024 to February 2028
- Start date:** The exact dates for each training session will be defined at a later stage based on the availability of participants and Experts
- End date:** to be defined later
- Effective duration per assignment:** see table below
- Schedule/programme:** see table below

The provisional programme for assignment implementation is as follows:

Activity	Place	Period	Duration (man/days) Expert 1:	
1. Training on Programmable Logic Controller Technology	Karongi or Kigali or Musanze	To be defined later	10 days (7 days for training and 3 days for preparation and reporting)	

2. Training on Pneumatics and Hydraulics Technology	Karongi or Kigali or Musanze	To be defined later	10 days (7 days for training and 3 days for preparation and reporting)	
3. Training on Electrical Power System Automation And Protection	Karongi or Kigali or Musanze	To be defined later	10 days (7 days for training and 3 days for preparation and reporting)	
4. Training on Automatic Control System Technology	Karongi or Kigali or Musanze	To be defined later	11 days (8 days for training and 3 days for preparation and reporting)	
5. Training on Power System Stability Analysis	Karongi or Kigali or Musanze	To be defined later	23 days (18 days for training and 5 days for preparation and reporting)	
6. Training on Power System Design	Karongi or Kigali or Musanze	To be defined later	18 days (14 days for training and 4 days for preparation and reporting)	
7. Training on Electrical Service Design for Buildings and Industries	Karongi or Kigali or Musanze	To be defined later	12 days (9 days for training and 3 days for preparation and reporting)	
8. Power System Protection and Control	Karongi or Kigali or Musanze	To be defined later	18 days (14 days for training and 4 days for preparation and reporting)	
9. Training on Power System Equipment Installation	Karongi or Kigali or Musanze	To be defined later	18 days (14 days for training and 4 days for preparation and reporting)	

6. Assignment reports

For each training session, a report following the model provided must be forwarded by e-mail on conclusion of the assignment

The analysis of pre and post-test to assess the impact of the training shall be conducted and each participant shall fill a training evaluation form to assess different aspect of the training (Organisation, delivery, logistic, etc.)

III. REQUIRED EXPERTISE AND PROFILE

The table below provide a required profile for each expert based on the training title. The applicants should specify proposed experts per each training session

Training title	Required qualification	Number of expert per assignment
1. Programmable Logic Controller Technology	<ul style="list-style-type: none"> ▪ At least a Master's degree in Electrical engineering or similar ▪ A minimum of 5 years proven practical experience in industrial automation and control systems ▪ Demonstrate an experience of at least 3 years in training/mentoring trainers in Electrical technology ▪ Should be fluent in English (very good verbal and written communication skills) ▪ Should have excellent computer literacy skills 	1
2. Pneumatics and Hydraulics Technology	<ul style="list-style-type: none"> ▪ At least a Master's degree in Electrical engineering or similar ▪ A minimum of 5 years proven practical experience in fluid power systems ▪ Demonstrate an experience of at least 3 years in training/mentoring trainers in Electrical technology ▪ Should be fluent in English (very good verbal and written communication skills) ▪ Should have excellent computer literacy skills 	1
3. Electrical Power System Automation And Protection	<ul style="list-style-type: none"> ▪ At least a Master's degree in Electrical engineering or similar ▪ A minimum of 5 years proven practical experience in power systems and automation technologies ▪ Demonstrate an experience of at least 3 years in training/mentoring trainers in Electrical technology ▪ Should be fluent in English (very good verbal and written communication skills) ▪ Should have excellent computer literacy skills 	1
4. Automatic Control System Technology	<ul style="list-style-type: none"> ▪ At least a Master's degree in Electrical engineering or similar ▪ A minimum of 5 years proven practical experience in automation system and troubleshooting ▪ Demonstrate an experience of at least 3 years in training/mentoring trainers in Electrical technology ▪ Should be fluent in English (very good verbal and written communication skills) ▪ Should have excellent computer literacy skills 	1
5. Power System Stability Analysis	<ul style="list-style-type: none"> ▪ At least a Master's degree in Electrical engineering or similar ▪ A minimum of 5 years proven practical experience in power systems dynamics and stability ▪ Demonstrate an experience of at least 3 years in training/mentoring trainers in Electrical technology ▪ Should be fluent in English (very good verbal and written communication skills) ▪ Should have excellent computer literacy skills 	1
6. Power System Design	<ul style="list-style-type: none"> ▪ At least a Master's degree in Electrical engineering or similar ▪ A minimum of 5 years proven practical experience in power system design. ▪ Demonstrate an experience of at least 3 years in training/mentoring trainers in Electrical technology ▪ Should be fluent in English (very good verbal and written communication skills) 	1

	<ul style="list-style-type: none"> ▪ Should have excellent computer literacy skills 	
7. Electrical Service Design for Buildings and Industries	<ul style="list-style-type: none"> ▪ At least a Master’s degree in Electrical engineering or similar ▪ A minimum of 5 years proven practical experience in designing electrical systems of buildings and industrial facilities ▪ Demonstrate an experience of at least 3 years in training/mentoring trainers in Electrical technology ▪ Should be fluent in English (very good verbal and written communication skills) ▪ Should have excellent computer literacy skills 	1
8. Power System Protection and Control	<ul style="list-style-type: none"> ▪ At least a Master’s degree in Electrical engineering or similar ▪ A minimum of 5 years proven practical experience in power system protection, control systems, and power system operation ▪ Demonstrate an experience of at least 3 years in training/mentoring trainers in Electrical technology ▪ Should be fluent in English (very good verbal and written communication skills) ▪ Should have excellent computer literacy skills 	1
9. Power System Equipment Installation	<ul style="list-style-type: none"> ▪ At least a Master’s degree in Electrical engineering or similar ▪ A minimum of 5 years proven practical experience in installation, commissioning, and maintenance of various power system components ▪ Demonstrate an experience of at least 3 years in training/mentoring trainers in Electrical technology ▪ Should be fluent in English (very good verbal and written communication skills) ▪ Should have excellent computer literacy skills 	1

IV. DELIVERABLES

The assignment will be subdivided into training sessions, conducted based on different purchase orders from October 2024 to February 2028. The estimated number of days are 124 which may vary downward.

For each training session, the following should delivered:

Deliverables	End date
<ul style="list-style-type: none"> ▪ Prepare the training program using the Project’s template and submit it for validation to the Component manager; 	10 days before the start of the training
<ul style="list-style-type: none"> ▪ Prepare all the material and necessary handouts to be used in the training and submit them for validation to Component manager; 	10 days before the start of the training
<ul style="list-style-type: none"> ▪ Prepare pre/post-test and develop the evaluation sheet in line with the guidance of the Component manager; 	10 days before the start of the training

<ul style="list-style-type: none"> ▪ Conduct a daily management of the training including daily attendance list; 	During the training period
<ul style="list-style-type: none"> ▪ Conduct a pre-test 	Day 1 of the training
<ul style="list-style-type: none"> ▪ Deliver the training session using validated materials 	During the training period
<ul style="list-style-type: none"> ▪ Conduct a post-test 	Last day of training
<ul style="list-style-type: none"> ▪ Organise industrial visit in relation with training where needed 	When needed
<ul style="list-style-type: none"> ▪ Provide a written report using the Project's template and send it for validation to the Component manager. The report should contain: An executive summary of the mission not exceeding 2 pages; Descriptive part analytical part (Analysis and recommendations); Programmatic part; Annexes: (Attendance list, content developed, PPT, tools, Result of pre and post evaluation; Training Satisfactory evaluation; Pictures 	5 days after the training

V. COORDINATION

The Hired expert/ or company representative shall nominate a contact person for project implementation purposes

For the side of Expertise France, all the communication shall be addressed to
Mr Kiba Muvunyi,
Component manager
Email: kiba.muvunyi@expertisefrance.fr
Tel: +250788355036

A launch meeting shall be held 2 days after the contract award has been notified. Close collaboration must take place with the contact person from assignment preparation right up to completion. Furthermore, regular exchanges must take place with the contact person on assignment progress and any difficulties that may be encountered.