

Terms of reference (ToR) for the procurement of services below the EU threshold

CONFIDENTIAL

Technical Evaluation Training and Expert Advice for dual TVET training programs in field of HV, RE in Mongolia.	Project number/ cost center: G-012416-001
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0. List of abbreviations

AG	Commissioning party
AN	Contractor
AVB	General Terms and Conditions of Contract for supplying services and work
FK	Expert
FKT	Expert days
KZFK	Short-term expert
ToR	Terms of reference
VR	Virtual Reality
CBT	Competency Based Training
RE	Renewable Energy
HV	High Voltage
TVET	Technical and Vocational Education, Training
BESS	Battery Energy Storage Systems
PV	Photovoltaic
PPE	Personal Protective Equipment

1. Context

The 'Cooperative Technical and Vocational Education Training-II (cTVET-II) project is part of the sustainable economic development, training and employment program. Mongolia faces a rapidly evolving labor market due to ongoing economic and industrial development, particularly in mining, construction, renewable energy, agriculture, and IT sectors. However, there is a growing skills gap in the workforce due to inadequate technical skills and the need for modernized training programs. The TVET system in Mongolia has traditionally struggled with a lack of alignment to industry needs and low-quality teaching in many areas. In response to these challenges, the project aims to improve the quality and relevance of vocational education in Mongolia, thereby ensuring that TVET institutions produce graduates with skills that are directly applicable to the labor market.

Energy sectors worldwide are undergoing rapid transformations towards a more sustainable and low-carbon pathway utilizing renewable resources. Renewable energy technologies not only present a more future-oriented technology choice but are in addition a promising way for expanding access to electricity to a larger part of the population with both on and off the grid.

In this regard, renewable energy is accelerating globally, creating a significant demand for skilled technicians in the renewable energy sector. GIZ Mongolia aims to develop a cooperative training program that addresses both short-term and advanced training needs in the renewable energy industry. The program will cater to diverse learning needs, including individuals transitioning from other technical sectors into renewable energy, and ensure it is accessible to all learners, including women and vulnerable groups.

Since October 2024, Nalaikh Polytechnic College and Darkhan Polytechnic College have been piloting Mongolia's first dual training curricula in the High voltage technician and renewable energy generation. Modeled after international dual training best practices (such as the German *Duale Ausbildung*), these programs combine institutional instruction with structured, in-company practical apprenticeships. First students enrolled in this pilot program is scheduled to graduate in October 2027. As the pilot dual training curricula progress toward their final evaluation phases, enhancing the capacity of teachers, technical assessors, and in-company instructors has become critical. To successfully deliver advanced technical skills (including commissioning, grid integration, BESS, and high-voltage safety) and to reliably execute standardized practical assessments, local educators and workplace mentors require comprehensive training in modern technical standards (DIN/VDE and EU) as well as competence-based assessment methodologies.

In 2025, an evaluation was conducted on the integration of digital learning tools into Renewable Energy (RE) and High Voltage (HV) technical training curricula in Mongolia. The primary objective of introducing these digital tools—such as Virtual Reality (VR) simulators—is to make technical education more inclusive and accessible. This approach enables students, particularly those located in remote and rural areas, to master complex and hazardous practical skills while reducing the required duration of physical, school-based training without compromising quality or safety.

2. Tasks to be performed by the contractor

The consultant is responsible for providing expert technical advice to design DIN/VDE and EU-compliant VR simulators and practical assessment modules in high voltage and renewable energy technology. They will plan and execute advanced hands-on training in Germany for Mongolian multiplier teachers, focusing on PV, BESS, and grid integration. Additionally, the

consultant must conduct training in Mongolia on high-voltage switching allowance, PPE testing, and German dual-system in-company assessment methodologies.

The services described in Section shall be provided from 20.11.2026 to 09.06.2028

The contractor is responsible for providing the following services:

Task 1: Technical Advice for VR Training Simulators and Practical Assessment Modules

- VR Simulator Development: Provide technical specifications and advisory support to the Mongolian development team for building Virtual Reality (VR) training simulators focused on high voltage (HV) technology and renewable energy generation (PV, Wind, BESS).
- Module Standards Alignment: Assist in designing practical assessment modules aligned with relevant DIN/VDE and EU safety and operational standards.
- Quality Assurance: Review and validate simulator scenarios and practical task blueprints to ensure technical accuracy and pedagogical relevance. To ensure the successful implementation of the project, the consulting team will provide the Mongolian team with the necessary information and resources.

VR Training Simulators including following modules:

- Power Plant – Turbine and Generator
- Electrical Substation / Switching technology
- Renewable Energy – Solar PV and
- Renewable Energy – Hydropower Plant
- Battery Energy Storage System (BESS)
- High Voltage, transmission line - Working at Height

Task 2: Coaching on Assessment Test Pool Development for RE & HV Training

- Mapping theoretical test items (multiple-choice, scenario-based) and practical evaluation tasks directly to learning outcomes aligned with EU/DIN VDE standards and Mongolian occupational profiles.
- Conduct hands-on technical writing workshops to coach Mongolian experts on constructing written questions, high-voltage safety situational exercises, and clear, objective step-by-step practical rubrics (e.g., commissioning sequences, arc flash risk calculations, and troubleshooting).
- Guide the local team in developing real-world practical test setups, including mapping test pool tasks to physical equipment labs and the Virtual Reality (VR) simulators developed under Task 1. This ensures seamless assessment execution across both digital and physical environments.
- Piloting of the draft test with a representative group of students at Nalaikh and Darkhan Polytechnic Colleges. Work alongside local assessors to analyze item difficulty, evaluate rubric consistency, and calibrate grading standards among different evaluators.
- Support the team in reviewing and finalizing a comprehensive, bilingual (Mongolian/English) RE & HV assessment test pool

Task 3: Practical and Methodical Training in Germany

Technical Focus Areas:

- SCADA, PLC & Digital Substation Automation: Hands-on simulation training in configuring automated grid controllers, IEC 61850 protocol digital substations, dynamic load-shedding relays, and automated AGC (Automatic Generation Control) interfacing for variable renewable energy.
- Systematic physical verification of mounting structures, module frame alignment, thermal expansion clearances, and cable tray protection against extreme freezing/wind loads. Checklist-driven audit of polarities, cable strain relief, bend radii, IP weather-sealing ratings on junction boxes/inverters, and compliance of connectors (MC4/equivalent) to prevent cross-mating arc hazards. Verification of PV module functionality using thermal, optical and electrical parameter measurements.
- BESS Operations & Thermal Management: Practical exercises on multi-megawatt Battery Energy Storage Systems (BESS), including state-of-charge (SoC) management, battery management system (BMS) diagnostics, thermal runaway mitigation, and automated HVAC/temperature control strategies for cold-climate battery operations.
- Grid Integration & Power Quality Diagnostics: Practical troubleshooting of grid synchronization, harmonics mitigation (using active filters), low-voltage ride-through (LVRT) testing, and automated reactive power compensation.

Task 4: Planning middle and high voltage transformers training in Mongolia

- Selection & Sizing of MV/HV Switchgear and Circuit Breakers
- Dimensioning & Calculation of Medium- and High-Voltage Transformers
- Design & Configuration of Earthing Systems and Neutral Grounding Topology
- Transmission Line Phenomena, Transient Effects, and Fault Analysis
- Advanced Transmission Line Fault Monitoring, Diagnostics, and Maintenance Technologies
- Occupational Health & Safety Compliance in High-Voltage Environments (DGUV / DIN VDE Standards).

Task 5: Switching allowance, PPE Testing Training in Mongolia

- Automated & Remote Switching Operations: Practical execution of high-voltage (HV) switching sequences using motorized isolators, automated circuit breakers, and SCADA-integrated remote switching protocols under DIN/VDE 0105-100 (Schaltberechtigung) standards.
- PPE & Arc-Flash Safety Diagnostics: Hands-on calculations for arc-flash boundary distances under high fault levels; selection and functional inspection of personal protective equipment (PPE).
- PPE Calculation & Application: Provide methodology for calculating personal protective equipment (PPE) requirements based on arc flash, voltage level, and hazard assessments.
- Provide certificates to participants successfully passed the test (To support Mongolian Energy Transition process, certificate must be meet requirements EU or Germany Energy sectors).

Task 6: In-Company Training Assessment Methodology Training in Mongolia

- Performance-Based Assessment Design: Structuring practical examination rubrics that evaluate direct troubleshooting, automation logic setup, wiring diagnostics, and safe working habits rather than theoretical memorization.
- Real-World Competency Task Station Setup: Establishing standardized practical exam stations (e.g., fault-finding on a live PV inverter, PLC programming, electrical installation) modeled on German IHK/HWK dual training examination standards.
- Performance-Based Assessment toolbox development: Practical training for assessor team in energy sector enable them able to plan and develop practical assessment toolboxes according to German IHK/HWK dual training examination standards.

Task 7: Execute Wind Power Safety & Rescue Qualification training in Mongolia

- Fit, inspect, and deploy fall arrest harnesses and lanyards; execute mandatory practical drills for self-rescue and colleague retrieval from elevation.
- Operate safely inside closed electrical spaces as an Electro technically Instructed Person by strictly enforcing the "Five Safety Rules" to de-energize systems before entry.
- Carry out specialized emergency response procedures, navigate site-specific escape routes, and deploy rapid descent devices or escape hoods in high-risk zones.
- Identify confined-space entry risks inside hubs and rotor blades, safely execute restricted-space operations, and conduct immediate extrications.
- Complete sea survival drills, wear maritime PPE, and perform safe transfer protocols including Helicopter Hoist and Helicopter Underwater Escape Training (HUET).

The contractor provides equipment and supplies (consumables) and assumes the associated operating and administrative costs.

The contractor manages costs and expenditures, accounting processes, and invoicing in line with the requirements of GIZ.

The contractor reports regularly to GIZ in accordance with the current AVB of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

Certain milestones, as laid out in the table below, are to be achieved during the contract term:

Milestones/process steps/partial services	Deadline/place/person responsible
Review training scenarios, contents, workplaces and equipment simulation. (see Task-1)	30.11.2026, Remote
Review 3D modelling/assets development.	30.01.2027, Remote
Review of assessment modules and user satisfaction survey report. (see Task-1)	30.08.2027, Remote
Preparation of training in Germany (see Task-3,4)	19.03.2027, Remote
Conduct training in Germany (see Task-3,4)	23.04.2027, Germany
Preparation of training in Mongolia (see Task-5,6)	30.06.2027, Remote
Conduct training in Mongolia (see Task-5,6)	30.11.2027, Ulaanbaatar
Coaching Assessment Test Pool Development (see Task-2)	31.05.2028, Remote
Final Report	09.06.2028, Remote

Period of assignment: from 20.11.2026 until 09.06.2028.

3. Concept

In the tender, the tenderer is required to show *how* the objectives defined in Chapter 2 (Tasks to be performed) are to be achieved, if applicable under consideration of further method-related requirements (technical-methodological concept). In addition, the tenderer must describe the project management system for service provision.

Note: The numbers in parentheses correspond to the lines of the technical assessment grid.

Technical-methodological concept

Strategy (1.1): The tenderer is required to consider the tasks to be performed with reference to the objectives of the services put out to tender (see Chapter 1 Context) (1.1.1). Following this, the tenderer presents and justifies the explicit strategy with which it intends to provide the services for which it is responsible (see Chapter 2 Tasks to be performed) (1.1.2).

The tenderer is required to present the actors relevant for the services for which it is responsible and describe the **cooperation (1.2)** with them.

The tenderer is required to present and explain its approach to **steering** the measures with the project partners (1.3.1) and its contribution to the **results-based monitoring system** (1.3.2).

The tenderer is required to describe the key **processes** for the services for which it is responsible and create an **operational plan** or schedule (1.4.1) that describes how the services according to Chapter 2 (Tasks to be performed by the contractor) are to be provided. In particular, the tenderer is required to describe the necessary work steps and, if applicable, take account of the milestones and **contributions** of other actors (partner contributions) in accordance with Chapter 2 (Tasks to be performed) (1.4.2).

The tenderer is required to describe its contribution to knowledge management for the partner (1.5.1) and GIZ and to promote scaling-up effects (1.5.2) under **learning and innovation**.

Project management of the contractor (1.6)

The tenderer is required to explain its approach for coordination with the GIZ project. In particular, the project management requirements specified in Chapter 2 (Tasks to be performed by the contractor) must be explained in detail.

The tenderer is required to draw up a **personnel assignment plan** with explanatory notes that lists all the experts proposed in the tender; the plan includes information on assignment dates (duration and expert days) and locations of the individual members of the team complete with the allocation of work steps as set out in the schedule.

4. Personnel Concept

The tenderer is required to provide personnel who are suited to filling the positions described, on the basis of their CVs (see Chapter 7), the range of tasks involved and the required qualifications.

The below specified qualifications represent the requirements to reach the maximum number of points in the technical assessment.

Team leader

Tasks of the team leader

- Overall responsibility for the advisory packages of the contractor (quality and deadlines)
- Coordinating and ensuring communication with GIZ, partners and others involved in the project
- Personnel management, identifying the need for short-term assignments within the available budget, as well as planning and steering assignments and supporting local and international short-term experts
- Regular reporting in accordance with deadlines
- Lead technical design and delivery of Task 3 (High-voltage switching authorization, PPE calculation, and testing certification training in Mongolia).
- Provide key technical inputs for Task 1 regarding High Voltage safety and assessment alignment with DIN VDE / EU standards.
- Oversee M&E frameworks for all training outputs and author the final project completion report.

Qualifications of team leader

- Education/training (2.1.1): university degree (German ‘Diploma’/Master) in Bachelor’s degree or higher in Electrical Engineering, or a related field.
- Language (2.1.2): C1-level language proficiency in English
- General professional experience (2.1.3): 10 years of professional experience in the High voltage transmission and distribution sector
- Specific professional experience (2.1.4): 5 years in Certified trainer High Voltage Switching Authorization (Schaltberechtigung for high/medium voltage per DIN VDE 0105-100/DGUV). Interaction Toolkit and/or Open XR API
- Leadership/management experience (2.1.5): 5 years of management/leadership experience as lead electric engineer.
- Regional experience (2.1.6): 3 years of experience in projects in capacity building training in Energy sector in Mongolia is highly desirable.
- Development cooperation (DC) experience (2.1.7): 3 years of experience in DC projects in Energy sector

Key expert 1: Renewable Energy Expert

Tasks of key expert 1

- Technical lead for Task 2 (planning and delivering the practical and methodical training program in Germany for Mongolian multiplier teachers).
- Provide technical subject-matter expertise for Task 1 on PV, BESS, and grid-integration assessment blueprints and VR simulation parameters.
- Deliver technical training sessions during the study tour in Germany, focusing on commissioning, safety protocols, and grid code compliance.

Qualifications of key expert 1

- Education/training (2.2.1): Bachelor’s degree or higher in Renewable Energy Engineering, Electrical Engineering, or a related field.
- Language (2.2.2): C1 -level language proficiency in language English

- General professional experience (2.2.3): 7 years of professional experience in the utility-scale and decentralized renewable energy systems sector
- Specific professional experience (2.2.4): 5 years of experience in commissioning, testing, and troubleshooting Photovoltaic (PV) plants, Battery Energy Storage Systems (BESS), and grid interconnection

Key expert 2: EdTech & VR Simulation Specialist

Tasks of key expert 2

- Lead delivery of Task 1 regarding VR simulator development advisory.
- Collaborate with local Mongolian VR development teams to define technical, functional, and pedagogical specifications for high-voltage and renewable energy VR simulators.
- Develop practical assessment integration frameworks that connect VR simulator performance data with competency evaluation metrics.

Qualifications of key expert 2

- Education/training (2.3.1): Bachelor's degree or higher in Software Engineering, Computer Science, Electrical engineering, or a related field.
- Language (2.3.2): C1 -level language proficiency in language English
- General professional experience (2.3.3): 7 years of professional experience in the TVET, Electric or ICT engineering sector
- Specific professional experience (2.3.4): 5 years of experience in VR/AR design or conducting training in the energy sector

Key expert 3: Dual Training Expert

Tasks of key expert 3

- Lead delivery of Task 4 (In-company training assessment methodology workshop in Mongolia based on dual international best practices).
- Provide pedagogical oversight for Task 2, ensuring Mongolian multiplier teachers master European instructional methodologies.
- Develop standardized evaluation rubrics, practical examination guidelines, and portfolio assessment tools for local Mongolian industry trainers and assessors.

Qualifications of key expert 3

- Education/training (2.4.1): Degree in Vocational Pedagogy, Electrical Engineering, or Master Craftsman (Elektromeister)
- Language (2.4.2): B2 -level language proficiency in language English
- General professional experience (2.4.3): 10 years of professional experience in the Maintenance and installation of electric and Industrial automation systems sector
- Specific professional experience (2.4.4): 5 years experience in designing and executing in-company practical assessments, chamber examinations (e.g., German IHK/HWK models), and workplace-based rubrics for electrotechnical trades.
- Regional experience (2.4.6): Proven experience in "Train-the-Trainer" (ToT) programs for multiplier teachers, industrial assessors, and workplace instructors in Central/East Asia.

- Development Cooperation (DC) experience (2.4.7): Experience working on international VET/TVET capacity development projects, ideally involving institutional capacity building for technical teachers or assessors

Soft skills of team members

In addition to their specialist qualifications, the following qualifications are required of team members:

- Team skills
- Initiative
- Communication skills
- Socio-cultural skills
- Efficient, partner- and client-focused working methods
- Interdisciplinary thinking

5. Costing requirements

Assignment of personnel and travel expenses

Per-diem and overnight accommodation allowances are reimbursed as a lump sum up to the maximum amounts permissible under tax law for each country as set out in the country table in the circular from the German Federal Ministry of Finance on travel expense remuneration (downloadable at <https://www.bundesfinanzministerium.de>).

Accommodation costs which exceed this up to a reasonable amount and the cost of flights and other main forms of transport can be reimbursed against evidence.

All business travel must be agreed in advance by the officer responsible for the project.

Sustainable Aspect of travel

GIZ would like to reduce greenhouse gas emissions (CO₂ emissions) caused by travel. When preparing your tender, please incorporate options for reducing emissions, such as selecting the lowest emission booking class (economy) and using means of transport, airlines and flight routes with higher CO₂ efficiency. For short distances, travel by train (second class) or e-mobility should be the preferred option.

If they cannot be avoided, CO₂ emissions caused by air travel should be offset. GIZ specifies a budget for this, through which the carbon offsets can be settled against evidence.

There are many different providers in the market for emissions certificates, and they have different climate impact ambitions. The [Development and Climate Alliance \(German only\)](#) has published a [list of standards \(German only\)](#). GIZ recommends using the standards specified there.

Specification of inputs

Fee days	Number of experts	Number of days per expert	Total	Comments
Team leader	1	80	80	
Key expert 1: Renewable Energy Expert	1	56	56	
Key expert 2: EdTech & VR Simulation Specialist	1	56	56	
Key expert 3: Dual Training Expert	1	80	80	
Travel expenses	Quantity	Number per expert	Total	Comments
Fixed travel budget	1	21,000 EUR	21,000 EUR	A budget is earmarked for travel to the following countries: Ulaanbaatar, Mongolia. A fixed budget of EUR 21,000 is earmarked for settling travel expenses against evidence. You can find further information on the travel expense budget in the 'Price schedule' document. Please use the 'Explanations' column in the price schedule to break down the individual items. Settlement is possible only until the budget is depleted.
CO ₂ compensation for air travel	2	4	784 EUR	A fixed budget of EUR 784 is earmarked for settling carbon offsets against evidence.
Other costs	Quantity	Price	Total	Comments
Flexible remuneration	1	10,000 EUR	10,000 EUR	A budget of EUR 10,000 is earmarked for flexible remuneration. Please incorporate this budget into the price schedule.

				Use of the flexible remuneration item requires prior written approval from GIZ.
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6. Requirements on the format of the tender

The structure of the tender must correspond to the structure of the ToR. In particular, the detailed structure of the concept (Chapter 3) should be organized in accordance with the positively weighted criteria in the assessment grid (not with zero). The tender must be legible (font size 11 or larger) and clearly formulated. It must be drawn up in English (language).

The complete tender must not exceed 10 pages (excluding CVs). If one of the maximum page lengths is exceeded, the content appearing after the cut-off point will not be included in the assessment. External content (e.g. links to websites) will also not be considered.

The CVs of the personnel proposed in accordance with Chapter 4 of the ToRs must be submitted using the format specified in the terms and conditions for application. The CVs shall not exceed 4 pages each. They must clearly show the position and job the proposed person held in the reference project and for how long. The CVs can also be submitted in English (language).

Please calculate your financial tender based exactly on the parameters specified in Chapter 5 Quantitative requirements. The contractor is not contractually entitled to use up the days, trips, workshops or budgets in full. The number of days, trips and workshops and the budgets will be contractually agreed as maximum limits. The specifications for pricing are defined in the price schedule.