APPENDIX I

PRICE SCHEDULE

IESR TRAINING EQUIPMENT LIST

A. ENERGY MIX TRAINING EQUIPMENT LIST

CATEGORY	NO.	EQUIPMENT	QTY	Unit Price DDP (0.03% PPCBL Incl. & VAT Exclusive) (KShs)	Total Price DDP (0.03% PPCBL Incl. & VAT Exclusive) (KShs)
LOT 1-	1	Diesel Generator	1		
	2	Wind Turbine	1		
	3	Hydro Turbine and associated items	1		
	4	Programmable Resistive Loads	4		
	5	Induction Loads	2		
	6	Capacitor Banks	2		
	7	Weather Stations	1		
	8	Advanced SCADA System	1		
	9	Water Tank	1		
	10	Installation accessories	1		
	11	Transportation and installation charges	1		
LOT 1- SUB TOTAL (KShs. PPCBL Incl. & VAT Excl.)					
ADD 16% VAT					
TOTAL COST KShs (0.03% PPCBL Incl. & VAT Incl.)					

B. ELECTRICAL, ELECTRONICS AND MECHANICAL EQUIPMENT LIST

LOT 2

CATEGORY	No	LAB	EQUIPMENT/ ACCESORIES	QTY	Unit Price DDP (0.03% PPCBL Incl. & VAT Exclusive) (KShs)	Total Price DDP (0.03% PPCBL Incl. & VAT Exclusive) (KShs)
LOT 2	1	High Voltage Technology Lab	Power transmission line trainer	2		
	2		Protection relays for high and low Voltage trainings	3		
	3		Distribution system trainer	2		
	4		RCL Circuit Trainer -	2		
	5		Electrical measurements modules	2		
	6		Transformer Training Kit -	2		
	7		Workshop metallic bench	9		
	8		Working tables	30		
LOT 2- SUB TOTAL (KShs. PPCBL Incl. & VAT Excl.)						
ADD 16% VAT						
TOTAL COST KShs (0.03% PPCBL Incl. & VAT Incl.)						

LOT 3

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	QTY	Unit Price DDP (0.03% PPCBL Incl. & VAT Exclusive (KShs)	Total Price DDP (0.03% PPCBL Incl. & VAT Exclusive) (KShs)
LOT 3	1	Machine Lab	Power supply unit for electric measurements and machines	1		
	2		Direct-current motor / generator with separate / compound / series excitation	1		
	3		Three-phase synchronous motor / generator with asynchronous starting	1		
	4		Three-phase asynchronous cage motor	1		
	5		Shunt field rheostat motor mod. RC1B/EV	2		
	6		Series field rheostat motor mod. RC1C/EV	4		
LOT 3- SUB TOTAL (KShs. PPCBL Incl. & VAT Excl.)						
ADD 16% VAT						
TOTAL COST KShs (0.03% PPCBL Incl. & VAT Incl.)						

LOT 4

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	QTY	Unit Price DDP (0.03% PPCBL Incl. & VAT Exclusive) (KShs)	Total Price DDP (0.03% PPCBL Incl. & VAT Exclusive) (KShs)
LOT 4	1	Fiber Optic Communication Training tools	Fusion splicing machine	1		
	2		Optical Time Domain Reflectometer (OTDR)	1		
	3		Fiber optic tool kit	6		
LOT 4- SUB TOTAL (KShs. PPCBL Incl. & VAT Excl.)						
ADD 16% VAT						
TOTAL COST KShs (0.03% PPCBL Incl. & VAT Incl.)						

LOT 5

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	QTY	Unit Price DDP (0.03% PPCBL Incl. & VAT Exclusive) (KShs)	Total Price DDP (0.03% PPCBL Incl. & VAT Exclusive (KShs)
LOT 5	1	Renewable Power Generation Lab	Hydro Power Generation Power Trainer	1		
	2		Wind Energy and Solar Photovoltaic Integrated Training System	1		
	3		Solar hydrogen fuel technology trainer	1		
LOT 5 - SUB TOTAL (KShs. PPCBL Incl. & VAT Excl.)						
ADD 16% VAT						
TOTAL COST KShs (0.03% PPCBL Incl. & VAT Incl.)						

LOT 6

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	QTY	Unit Price DDP (0.03% PPCBL Incl. & VAT Exclusive) (KShs)	Total Price DDP (0.03% PPCBL Incl. & VAT Exclusive) (KShs)
LOT 6	1	Automotive Electric Mobility Trainer Kit	Automotive Electric Mobility Trainer Kit	1		
LOT 6 - SUB TOTAL (KShs. PPCBL Incl. & VAT Excl.)						
ADD 16% VAT						
TOTAL COST KShs (0.03% PPCBL Incl. & VAT Incl.)						

SUMMATION

No.	Description	SUB TOTAL (KShs. 0.003% PPCBL Incl. & VAT Excl.) Subtotal	Add 16% VAT	TOTAL COST (0.03% PPCBL Incl. & VAT Incl.)
1	LOT 1			
2	LOT 2			
3	LOT 3			
4	LOT 4			
5	LOT 5			
6	LOT 6			
	ALL			

APPENDIX II

TECHNICAL SPECIFICATIONS FOR TRAINING EQUIPMENT AND MATERIALS

A. ENERGY MIX TRAINING EQUIPMENT SPECIFICATIONS

CATEGORY	NO.	EQUIPMENT	SPECIFICATIONS	BIDDER TO INDICATE THEIR SPECIFICATIONS/ COMPLIANCE
LOT 1- Bidders should note that this lot comprises items 1 to 11 that should be compatible and work with the SCADA system specified for training purposes. The bidder should provide a design of the entire system for 1 to 11 as part of the bid submission.	1	Diesel Generator	Power Output: 10 kW, Type: 3-phase,Controller: Programmable for integration with mini grid controllers and micro SCADA, - Output Control: Controllable via micro SCADA, allowing set output without following load profile,- Operating Frequency: 50 Hz with ±0.5 Hz deviation without automatic shutdown (override Enabled), - Fuel Type: Diesel, - Cooling System: Liquid-cooled, - Noise Level: ≤ 75 dB(A) at 7m	
	2	Wind Turbine	Turbine Rated Power Output: 3 kW,- Type: 3-phase,- Controller: Programmable for micro SCADA integration,- Synchronization: Must allow synchronization with mini grid frequency,- Blade Design: Aerodynamic blades for optimal performance,- Cut-in Wind Speed: ≤ 3 m/s,- Rated Wind Speed: 12 m/s,- Survival Wind Speed: ≥ 20 m/s	
	3	Hydro Turbine And variable electrical water pump of appropriate size for boosting the water flow rate to the hydro turbine	1. Turbine power output- 3kW, The Pelton turbine should have at least 2 nozzles. Efficiency: ≥ 85% 2. Over-head 3000 liters tank to be used to run the turbine; a 6 m head tower to carry the tank is provided. 3. Variable electric booster pump enough to provide the required maximum flow rate to run the turbine at maximum 3 kW. Maximum pump head rating	

CATEGORY	NO.	EQUIPMENT	SPECIFICATIONS	BIDDER TO INDICATE THEIR SPECIFICATIONS/ COMPLIANCE
			should not exceed 100m. 4. A holding water tank after the turbine is 1000 liters (provided at site), bidder to undertake the installation. 5. A recirculation water pump sufficient to ensure the overhead 3000 liters tank at all times is 75% full to be designed and provided by bidder. 6. The diameter of the Penstock should not exceed 3 inch. 7. Bidder to provide instruments to enable capturing of the following on the SCADA system: Power output, Flow rates, Net Head pressure, Shaft speed, Generator output, Valve (nozzles) position, Temperature (water and Bearings), Shaft Torque, Turbulence and Buckets impact forces. 8. Controller: programmable for micro SCADA integration, - Output Control: Controllable via micro SCADA, allowing set output without following load profile-	
	4	Programmable Resistive Loads	Type: Electrical resistive loads, - Control: Programmable for loading and offloading in micro grid-1kW	
	5	Induction Loads	Type: Inductive loads for testing, - Control: Programmable for loading and offloading, - Purpose: For training on voltage management, 2kVAR	
	6	Capacitor Banks	Control: Manual and automatic switching capabilities 2kVAR	

CATEGORY	NO.	EQUIPMENT	SPECIFICATIONS	BIDDER TO INDICATE THEIR SPECIFICATIONS/ COMPLIANCE
	7	Weather Stations	Functionality: Collects data on temperature, humidity, solar radiation, and wind patterns, Sensors: Multiple Sensors for accurate data collection: wind measurement Sensors, temperature Sensors, irradiation Sensors, water flow Sensors etc.	
	8	Advanced SCADA System	Functionality: Integrates and compatible with energy sources specified above, namely 10kW diesel generator, 3kw Wind turbine, 2kW hydro turbine; and 15kW solar PV and output loads (resistive loads, inductive loads and capacitive loads) for **training and** real-time monitoring and control. Should have Intuitive interface for ease of use. Should be supplied with Supply 43" (Diagonal size) Smart Board with the following specifications ;Resolution 1920*1080P, Display Area;944*534 mm, Display Type; E-LED, Ratio of display;16:9, Best viewing angle up: 89 down 89, left: 89 right: 89; Max. viewing angle, 178°, Windows Operating system, CPU i3 2nd Generation intel CPU, Memory;4GB DDR3, Hard Disk(SSD)-128GB, Touch technology, Interfaces (in the back of the panel); HDMI, USB, RJ45,AV in, X1, VGA in, Audio in, USB 2.0, USB 3.0 and connecting accessories.	
	9	Water Tank	Cylindrical vertical water tank; made of polythene material (food grade); capacity: 3,000.00	

CATEGORY	NO.	EQUIPMENT	SPECIFICATIONS	BIDDER TO INDICATE THEIR SPECIFICATIONS/ COMPLIANCE
			liters, Double layer.	
	10	Installation accessories	Appropriate cables sizes for connecting all the system components above, pipes for use as penstock for the hydro turbine, circuit breakers, mounting racks.	
	11	Transportation and installation charges	Transportation of all the components to site, installation and testing/commissioning to ensure proper functionality and compatibility for items 1 to 11 above.	

B. ELECTRICAL, ELECTRONICS AND MECHANICAL EQUIPMENT SPECIFICATIONS

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	SPECIFICATIONS	APPLICABLE COURSES	BIDDER TO INDICATE THEIR SPECIFICATIONS / COMPLIANCE
LOT 2	1	High Voltage Technology Lab	Power transmission line trainer	**Features:** Voltage, Current, Power, Power Factor Measurement Simultaneous display of sending & receiving end Inbuilt Variable AC Supply Big Graphical LCD Exclusive and attractive designed panel Standalone operation Designed by considering all safety precautions	Trainings On Power Transmission Line Technology	

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	SPECIFICATIONS	APPLICABLE COURSES	BIDDER TO INDICATE THEIR SPECIFICATIONS / COMPLIANCE
				Diagrammatic representation for ease of connections Extensive Learning Material CD. **Technical Specifications**: Mains Supply Single Phase Variac Input Output : 230 V ±10%, 50 Hz : 230 V : 0-270 V Current : 0-5 Amp Display Measurement Voltage : ≥ 25 V Current : ≥ 0.2 A Active Power Reactive Power Apparent Power Loads : ≥ 20 W [2000] W : ≥ 20 VAR [2000] VAR : ≥ 20 VA [2000] VA Resistor : 700 Ω/ 100 W Inductor : 800 mH/ 0. 5A Capacitor : 12.5 µF/ 450V		
	2		Protection relays for high and low Voltage trainings	Study of the operational characteristics of protection relays. Typical applications of protection relays. **Specification:** Set of modules for studying static protection relays and		

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	SPECIFICATIONS	APPLICABLE COURSES	BIDDER TO INDICATE THEIR SPECIFICATIONS / COMPLIANCE
				measuring transformers: **Module-1:** 1 three-phase maximum-current and short-circuit relay, adjustment range 0,5-2A/1-16 A ac, auxiliary power supply of 230 V 50-60 Hz. **Module-2:** 1 single-phase maximum or minimum current relay, adjustment range 0.1-5A/ 5-25 A ac/dc, auxiliary power supply of 230 V 50-60 Hz. **Module-3:** 1 three-phase maximum and minimum voltage relay /N, adjustment range +10% / -15%, Ue 380-400 Vac, self-powered. **Module-4:** 1 single-phase maximum or minimum voltage relay, adjustment range 2-500 Vac/dc, auxiliary power supply of 230 V 50-60 Hz. **Module-5:** 1 maximum and minimum frequency		

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	SPECIFICATIONS	APPLICABLE COURSES	BIDDER TO INDICATE THEIR SPECIFICATIONS / COMPLIANCE
				relay, 50-60 Hz, adjustment range + 10%, self-powered at 230 Vac. **Module-6:** 1 phase sequence and voltage asymmetry relay for networks of 400 V, asymmetry adjustment range: 5 - 15%, self-powered at 400 Vac. **Module-7:** 1 auxiliary relay with two exchange contacts, driven by TTL/PLC signals / buttons of 24 Vdc for excitation, stop, start. **Module-8:** 1 auxiliary relay with two exchange contacts, excitation 24 Vdc, 1 optical acoustic indicator of 24 Vac/dc. **Module-9:** 1 timer relay with one exchange contact, multi-function, multi-range, multi-voltage, 24 Vac/dc **Module-10:** directional over current relay, 5 A – 400 V, auxiliary		

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	SPECIFICATIONS	APPLICABLE COURSES	BIDDER TO INDICATE THEIR SPECIFICATIONS / COMPLIANCE
				power supply of 230 Vac. **Module-11:** 3 wound-primary current transformers 10/5 A, performance 3 VA in cl. 0.5. **Module-12:** voltage transformers 500/100 V, performance 10 VA in cl. 0.5. **Module-13:** 1 current step-up transformer 5 + 5 + 5/5 A, performance 8 VA in cl. 0.5		
	3		Distribution system trainer	• Framework to be made of sheet steel chemically treated and painted with several coats of epoxy varnish; its base to be provided with rubber feet and it can be positioned on a working top. All the necessary electric components for the correct power supply of circuits to be included in the panel. A theoretical experimental handbook to be	Testing Distribution System Trainings	

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	SPECIFICATIONS	APPLICABLE COURSES	BIDDER TO INDICATE THEIR SPECIFICATIONS / COMPLIANCE
				supplied. The main components installed and accessible, electrically, via safety terminals for plugs with diameter of 4 mm are: • 1 three-phase insulation transformer – 230-400 V / 230-400 V; 1500 VA • 1 differential circuit breaker – 4 x 6 A; curve C with minimum voltage releasing coil, stop/emergency button with mechanic holding and signalling LED on operation panel • 1 power line of 230 Vac -1 A for powering auxiliary devices • 1 three-pole lever selector for inserting two different values of capacitance to earth in IT line • 1 simulation of substation earthing with resistances of 0.3 Ω, 1 Ω • 1 simulation of earth plate with resistances of 2 Ω,		

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	SPECIFICATIONS	APPLICABLE COURSES	BIDDER TO INDICATE THEIR SPECIFICATIONS / COMPLIANCE
				20 Ω, 200 Ω, 2 kΩ • 2 simulators of power consuming devices with sinusoidal or unidirectional earth fault current; fault resistance of 50 kΩ, 15 kΩ, 5 kΩ, 1.5 kΩ, 500 Ω, bolted fault • 1 monitor for checking the isolation in IT systems with adjustment of the value of tripping sensitivity, and scale for monitoring the instantaneous value of insulation resistance of the installation • 1 differential circuit breaker 4 x 2 A, curve C, provided with remote opening current start-up coil • 1 four-pole differential circuit breaker of 25 A / 0.3 A, class A, “S” selective • 1 set of three fuse holders, with breakable neutral conductor and fuses 10.2 x 38 of 1 A and 2 A		

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	SPECIFICATIONS	APPLICABLE COURSES	BIDDER TO INDICATE THEIR SPECIFICATIONS / COMPLIANCE
				• 1 automatic magneto thermal differential switch 2 x 1 A, curve C, class AC, with possibility of using the only magneto thermal switch without the differential part • 1 automatic magneto thermal differential switch 2 x 1 A, curve C, class A, with possibility of using the only magneto thermal switch without the differential part • 1 differential relay coupled to a toroidal transformer with adjustable current Idn and tripping time		
	4		RCL Circuit Trainer -	• On board Fixed DC Power Supply : ±5V/200mA • On board Digital Frequency Counter: 10Hz-2KHz (Accuracy±10%) • On board Function Generator: 100Hz-1.7KHz • On board Resistors: 3Nos • On board Inductors: 3Nos		

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	SPECIFICATIONS	APPLICABLE COURSES	BIDDER TO INDICATE THEIR SPECIFICATIONS / COMPLIANCE
				• On board capacitors: 3Nos • Input Line Voltage: 230V AC ± 10%, 50Hz • Power ON/OFF switch with fuse protection		
	5		Electrical measurements modules	Set of devices: 2 Modules AZ-50: - 1 three-pole power switch , 1 Module AZ-67: - 1 phase sequence indicator with lamps A	Electrical Measurements Training Technologies	
	6		Transformer Training Kit -	The board should consist of the following built-in parts: 1. Two Digital AC Voltmeter 0 — 1000 V. 2. Two Digital AC Ammeter 0 — 2 Amp. 3. Digital Watt meter single phase Potential coil 250 Volt Current coil 2Amp. Total Watt 500W. 4. Temperature Meter. 5. Single Phase Auto Transformer: Primary Voltage : 230V, Secondary voltage : 0-270V; Rated current : 2Amp.	Trainings on Three -Phase Transformer	

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	SPECIFICATIONS	APPLICABLE COURSES	BIDDER TO INDICATE THEIR SPECIFICATIONS / COMPLIANCE
				6. Single Phase Transformer : Rating : 500W; Primary Voltage : 0 - 110 V, 0-110V; Secondary Voltage : 0 - 110V/1A, 0 - 12V/3A, 24V/1.5A 42V/1A and 110V/1A 7. Three Phase Transformer (Using Three Single Phase Transformer) Secondary voltage: 220V; Rated current: 500mA; Load: Two-100W bulb Provided for Load & three pin Socket for external Load provided. 8. Current Transformer Ratio: 1:10 9. MCB for short circuit and over current 2Amp 10. Power Requirement 380V ±10% at 50HzAC Mains. 11. Dimensions (mm) : 600 W x 450D x 600 H		
	7		Workshop metallic bench	Portable heavy duty Steel Workbench, 300kg Max Load,	Trainings On Electrical installations	

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	SPECIFICATIONS	APPLICABLE COURSES	BIDDER TO INDICATE THEIR SPECIFICATIONS / COMPLIANCE
				910mm x 1000mm x 600mm, with grey paint and leg caps		
	8		Working tables	Length x Width (mm): 1800 x 1000, Height (mm): 840mm(without castors) Workbench Top: 20mm off-white high density laminate with 3mm pvc edging Frame: mild steel heavy gauge (40mm x 40mm) End Caps Rubber Foot Steel protector(40mmx40 mm	All Trainings	
LOT 3	1	Machine Lab	Power supply unit for electric measurements and machines	Main control device of electro-magnetic type, with key switch; magneto-thermal differential circuit breaker of high sensitivity and emergency pushbutton	Training On Electric Measurements and Machines	

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	SPECIFICATIONS	APPLICABLE COURSES	BIDDER TO INDICATE THEIR SPECIFICATIONS / COMPLIANCE
	2		Direct-current motor / generator with separate / compound / series excitation	Power: 300 W , Armature voltage: 220 Vdc ,Separate excitation voltage 220 Vdc , R.p.m.: 3000		
	3		Three-phase synchronous motor / generator with asynchronous starting	Power: 350 VA , Voltage: 230/400 V 50 Hz , R.p.m.: 3000 (2 poles) ,Excitation voltage: 220 Vdc		
	4		Three-phase asynchronous cage motor	Power: 500 W , Voltage: 230/400 V 50 Hz ,R.p.m.: 2850 (2 poles) , Delta-star connection , Weight: 10 kg		
	5		Shunt field rheostat motor mod. RC1B/EV	Linear rheostat , Power: 500 W , Current: 1.58 A, Resistance value: 200 Ω Terminals		
	6		Series field rheostat motor mod. RC1C/EV	Linear rheostat , Power: 500 W ,Current: 3.16 A , Resistance value: 50 Ω , Terminals: 3 , Dimensions: 550 x 100 x 150 mm		

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	SPECIFICATIONS	APPLICABLE COURSES	BIDDER TO INDICATE THEIR SPECIFICATIONS / COMPLIANCE
LOT 4	1	Fiber Optic Communication Training tools	Fusion splicing machine	Package Accessories: FSM-80S fusion OR Equivalent splicer Battery BTR-09 Battery Charge Cord, DCC-18 Fujikura Fiber Cleaver, CT-06 AC Adapter, ADC-18 AC Cord, ACC-14 Spare Electrodes (pair), ELCT2-20A Sheath Clamp, S70A USB Cable, Alcohol Dispenser, Screw Driver, Splicer Carrying Strap, Quick Reference Guide, Video Instruction Manual Transit Case with Carrying Strap, CC30 Splices all known types of fibers. Fiber core alignment. Typical average splice loss for single mode cable with G.652D fiber is only 0.02 dB. Reduced splicing time – 7 seconds only. Heating time – 14 seconds only. Reduced splicing time – 7 seconds only.	Trainings On Fiber Optic Communication Technology	
	2		Optical Time Domain Reflectometer (OTDR)	EXFO or equivalent; Optical Interface(s) FC,LC,MU,SC,ST Optical Fiber Type Single-mode Form Factor		

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	SPECIFICATIONS	APPLICABLE COURSES	BIDDER TO INDICATE THEIR SPECIFICATIONS / COMPLIANCE
				Handheld Center Wavelength(s) 1310 ± 20 nm / 1550 ± 20 nm and 1625 nm ± 20 nm live port Testing Distance 0.1 – 400 km Event Dead Zone 0.7 m Attenuation Dead Zone 3 m Dynamic Range 36/35 dB Optical Power Meter Wavelength(s) 1310 nm, 1550 nm and 1625 nm live port		
	3		Fiber optic tool kit- 6pcs	• 1 x Toolkit with Detachable Straps • 1 x Optical fiber red light test pen • 1 x CFS-2 Duplex optical fiber coating layer stripping pliers • 1 x Leather line cable stripping		

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	SPECIFICATIONS	APPLICABLE COURSES	BIDDER TO INDICATE THEIR SPECIFICATIONS / COMPLIANCE
				machine • 1 x High precision FC 6s cutter • 1 X High precision optical power meter • 1 x Optical fiber fixed length unit		
LOT 5	1	Renewable Power Generation Lab	Hydro Power Generation Power Trainer	The system should be designed for the study and display of both the behavior and characteristics of a Pelton turbine. The turbine housing **is** transparent to show how the turbine uses the inertia produced by a water jet. Technical Specifications: 1. Diameters: • Impulse piping Ø external = 32 mm. • Inlet piping Ø internal = 10 mm. 2 Manometers: • Bourdon type with glycerine 0 to 25 m.w.c. 3. Characteristics of the electric brake: • DC generator • Rated speed: 3000 rpm • Rated power: 1000 W	Trainings on Hydro Power Generation Power Technology	

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	SPECIFICATIONS	APPLICABLE COURSES	BIDDER TO INDICATE THEIR SPECIFICATIONS / COMPLIANCE
				4. Characteristics of the turbine: • Number of blades: 16. • Diameter of the rotor: 124 mm. • Depth of the buckets: 14 mm. • Diameter of the jet flow: 10 mm. • Diameter of the axis: 16 mm. • Rated speed: 1000 rpm More data: • Speed sensor • Load cell • Electronic displays		
	2		Wind Energy and Solar Photovoltaic Integrated Training System	Technical Parameters 1. Input power: 220V ± 10% 50HZ 2. Equipment size: 1550 mm × 800 mm × 1750m 3. Floor area: 2 square meters (single unit) 4. The overall weight of the equipment: 40Kg 5. Working environment: temperature - 10℃～40℃ 6. Relative humidity ＜85％ (25℃) Desired Training Content		

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	SPECIFICATIONS	APPLICABLE COURSES	BIDDER TO INDICATE THEIR SPECIFICATIONS / COMPLIANCE
				1. Demonstration experiment of solar cell power generation 2. Solar photovoltaic panel energy conversion experiment **3.** Environmental impact experiment on photovoltaic conversion **4.** Direct load characteristic experiment of solar cell photovoltaic system 5. Demonstration experiment of solar controller work 6. Reverse connection protection experiment 7. Overcharge protection experiment of battery by solar controller 8. Over-discharge protection experiment of battery by solar controller 9. Anti-recharge experiment at night		

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	SPECIFICATIONS	APPLICABLE COURSES	BIDDER TO INDICATE THEIR SPECIFICATIONS / COMPLIANCE
				10. Demonstration experiment of off-grid inverter 11. Demonstration experiment of grid-connected inverter 12. Photovoltaic grid-connected experiment		
	3		Solar hydrogen fuel technology trainer	System Technology Unit : • Max. input current, photovoltaics 30 A • System voltage, photovoltaics 24 V DC • Max. output current 12 V DC - 2 A • Max. continuous output 230 V AC - 700 W • Momentary peak load 1050 W (for 10 sec) • Output voltage frequency 230 V, 50Hz, True Sinus. Solar Module: • Type - Polycrystalline System voltage 24 V DC • MPP output > 250 Wp • Efficiency >16 % • Short circuit	Trainings On Solar Hydrogen Fuel Technology	

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	SPECIFICATIONS	APPLICABLE COURSES	BIDDER TO INDICATE THEIR SPECIFICATIONS / COMPLIANCE
				current - >= 9A • MPP voltage > 30V Battery: • Type - 2 solar lead-acid batteries (12 V), maintenance-free • System voltage 24 V DC • Capacity 55 Ah. Hydrogen Generator: • Production capacity -72nl/h • H2 flow rate 1200cc/min. • Hydrogen purity > (99.99999 %) • Outlet pressure 16 bars • Required water quality - < 1µS/cm, deionized or distilled • Power supply voltage - 100-240 Vac 50Hz • Internal tank capacity - 1,1l • External tank capacity >= 5litres • Dimensions Rack - 19"		

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	SPECIFICATIONS	APPLICABLE COURSES	BIDDER TO INDICATE THEIR SPECIFICATIONS / COMPLIANCE
LOT 6	1	Automotive Electric Mobility Trainer Kit	Automotive Electric Mobility Trainer Kit	• Fully functional EV trainer based on Nissan Leaf electric vehicle components. • Electric motor, controller, and battery system, including a 24 kWh high-voltage Li-ion battery with 48 modules. • Integrated electric air conditioner compressor and other auxiliary systems. • Complete safety features, including high-voltage cables with plexiglass protection and a high-voltage disconnect fuse. • Mobile aluminum frame with castors for easy classroom integration. • Comprehensive wiring diagram showing all sensors, actuators, and data transmission lines. • Diagnostic capabilities through OBD	Trainings On Automotive Electric Mobility technology	

CATEGORY	NO	LAB	EQUIPMENT/ ACCESORIES	SPECIFICATIONS	APPLICABLE COURSES	BIDDER TO INDICATE THEIR SPECIFICATIONS / COMPLIANCE
				16-pin connector, facilitating fault detection and data analysis. • Real-time monitoring of battery state, including SOC, temperature, and voltage regulation via the Li-ion battery controller.		