ADDENDUM NO.1 TO BIDDING DOCUMENTS OF DESIGN, SUPPLY, INSTALLATION,

TESTING AND COMMISIONINGOF A 16 KW SOLAR PV SYSTEM, AC AND CCTV

1. **At S.No. 31 General Conditions of contract /supply order /Delivery of items after Para No. 04 following paras are added.**

5. The Vendor/Supplier shall be responsible to provide & execute the project including detailed Design, Supply, Installation, Testing, Commissioning, and Calibration of Solar on- Grid Net Metering Capable System.
6. It would be responsibility of the Vendor/Supplier, after award to ensure all the works as per scope of the specification/ standards are completed for safe and efficient working of the system by following OHSAD/ ISO, IEC standards, Alternate Energy Development Board AEDB), National Electric Power Regulatory Authority (NEPRA) and Concerned Distribution Company, Islamabad Electric Supply Company IESCO/AJKED.
7. Vendor/Supplier shall abide by and comply with all rules, regulations, directives, and any written requirement as set out by NEPRA/ AEDB/ IESCO/AJKED or any other relevant authority with regards to the solarization process.
8. The System installation shall be completed with all protective devices (Earthling, Lightening Arrestors, AC/DC Disconnects, Manual Switch, Surge Protection, AC/DC Current and Voltage Monitoring), control room for inverter installation & solar mounting structure at concrete pads on roof top/ site (civil work for concrete(1:2:4) pads on roof top & parking shed as per site requirements and mentioned in BOQ/Technical requirements will be responsibility of the Vendor/Supplier, AC Power Distribution Cabinet (LV Panel) must house all the AC disconnects, Bus bars, Manual ON/ OFF switch, breakers, energy meter, Voltage and Current meters, etc.
9. Supplier must provide & install separate LV Safety Panels for each building/area dedicated for that particular Solar PV System before injection into the Building/Area LV Panel.
10. The system must be complete in all respects with all components and accessories whether or not the same have been quoted/mentioned in the RFP. All the fittings and accessories that might not have been mentioned specifically in the specification but are necessary for equipment's of the solar PV system shall be deemed to be included in the scope of specification and shall be supplied and furnished by the supplier without any extra charges.
11. The university reserves the right to increase/decrease quantity of any items (s) at any stage of the procurement process, contract execution period and as per site requirement. The unit rates must be quoted.
12. The whole system warranty will be on suppliers' letter, Suppliers will be responsible for all repair

works with parts on its own arrangements and expenses during the warranty period.

13. The Vendor/Supplier will provide complete PSI/CoC test reports of Solar PV modules from accredited Lab of quoted solar PV modules as per IEC Standards and as well for CCTV,AC. The purchaser shall have all the rights to get tested or verified from laboratories any items/ components of Solar PV System, CCTV, and AC if in doubt.
14. Client can ask any time for any testing, verification, and confirmation letter from supplier/ manufacturer for manufacturing and supply of any component of Solar PV System ED, CCTV, and AC. If any kind of testing is required, the supplier/ firm will be required to facilitate the testing (before/ after) delivery at his own cost.
15. The Supplier will be bound to provide technical and operational manual & Software at the time of delivery/ upon completion. Before final inspection, the Supplier must provide one Box File with complete documentation, date sheets of all components, operational & maintenance manuals & necessary software's sales and service persons' contacts with cell number, emails, inspection report and this reference Box file available to all.
16. Must Provide all relevant diagrams, System Interconnection wiring drawings, layout plan, CCTV, PV Panel Shed diagrams, Single line diagrams (SLD) including but not limited to this, of the installed Solar PV on Grid Net Metering System (Complete in all respect) as per site, (as built basis) upon completion of the services. All the supportive, valid, genuine, and traceable documents must be provided.
17. Net Metering Consultancy & Documentation, License & Bidirectional Meter, installation and commissioning, inspection, and approval by NEPRA/ IESCO. (Complete in all respect as per site requirement).
18. The Supplier/ Installer must ensure compliance with the requirement as specified by NEPRA / AEDB & Concerned DISCO (IESCO, AJKED) in its regulations for Net Metering. The supplier installer shall ensure that the whole process with regards to Net Metering connection, from application till approval & connection, net meter installation, working, must be completed within the contract period.

2. At Serial NO.39 Specification of Required Items for Lot -03 Designing, supply, installation; Commissioning and testing of Solar System are replaced with following specifications.

- The bidder must conduct a **site visit** before submitting the quotation to assess requirements accurately.
- The installation shall be carried out by **qualified engineers/technicians**.
- All electrical and structural works shall conform to **standards**.
- The system must include **remote monitoring capability**.

- The bidder shall ensure **proper training and handover** to the university staff upon completion.
- Comprehensive warranty of the complete system must be provided on a **PKR 100 stamped paper**, duly signed and stamped.
- Warranty certificates (minimum 10 years for panels, 10 years for inverter and 5 years for batteries extendable to 10 years) must be provided.
- Bidders must be registered with relevant tax authorities (FBR/Income Tax/Sales Tax).
- Bidders must have prior experience in similar solar projects (minimum 20 kW cumulative installed capacities).
- Prices must be quoted in PKR, inclusive of all applicable duties and taxes, delivery, installation, and commissioning.
- Testing, commissioning, and handover with complete documentation.
- Training of local staff for basic operation and maintenance.

16kW Solar System with 3-Phase Hybrid Inverter (IP65)

Model: 16 kW Outdoor Hybrid Inverter

Application: On Grid-tie + Off-grid + Backup (with $LiFePO_4$ battery)

Location suitability: Bagh, AJK (harsh outdoor conditions)

Electrical Characteristics

- **Rated AC Power:** 16 kW (3-phase)
- **Nominal AC Voltage:** 3 × 400/230 V (configurable 380/400/415 V)
- **AC Voltage Range:** 310–480 V L-L
- **Nominal Frequency:** 50 Hz (45–65 Hz)
- **Rated AC Current:** ~29 A per phase @ 400 V
- **Power Factor:** 0.8 lagging … 0.8 leading (adjustable)
- **AC THD:** ≤ 3 %
- **Switch-over Time (to backup):** 0 ms
- **Night Consumption:** same as day time

PV Input

- **Max PV Power (DC):** 26 kWp (oversizing allowed)
- **Max DC Voltage:** 1000 Vdc
- **Start-up Voltage:** ≤ 200 Vdc
- **MPPT Voltage Range:** 200–850 Vdc
- **No. of MPPTs:** 2–4 (independent)
- **Max Current per MPPT:** ≥ 26 A
- **PV Conversion Efficiency:** ≥ 98.5 % peak, ≥ 97.5 % Euro

Battery Interface

- **Battery Type:** $LiFePO_4$ with BMS communication (CAN/RS-485)
- **Nominal Voltage:** 400–600 Vdc (typical: 512 Vdc)
- **Operating Voltage Range:** 350–600 Vdc
- **Max Charge/Discharge Power:** 16 kW
- **Max Charge/Discharge Current:** Up to 50 A (configurable)
- **Round-trip Efficiency:** ≥ 96 %
- **Cycle Life Support:** ≥ 6000 cycles @ 80 % DoD

Efficiency

- **Inverter Peak Efficiency:** ≥ 98.5 %
- **Euro Efficiency:** ≥ 97.5 %
- **Battery Conversion Efficiency:** ≥ 96 %

Protection & Safety

- **Protections:** DC reverse polarity, DC/AC surge (Type II SPD), over-current, over/under-voltage, short-circuit, ground fault, anti-islanding (per IEC 62116)
- **Cooling Protection:** Over-temperature derating, fan failure alarm
- **Standards:** IEC/EN 62109-1/2, IEC 62477-1, IEC 61727, IEC 62116, IEC 61000-6-2/4, IEC 60529 (IP65)

Communication & Monitoring

- **Interfaces:** RS-485, CAN, Ethernet, Modbus-RTU/TCP

- **Optional:** Wi-Fi / 4G gateway
- **Monitoring:** Local LCD / touchscreen HMI; remote cloud portal
- **Dry Contacts:** Genset start/stop, alarms, programmable I/O

Mechanical & Environmental

- **Enclosure:** IP65 outdoor, powder-coated steel/aluminum, UV resistant
- **Dimensions (approx):** ≤ 1000 mm (H) × 700 mm (W) × 350 mm (D)
- **Weight:** ≤ 120 kg
- **Operating Temp:** −25 °C … +85 °C (derating > 45 °C)
- **Humidity:** 0–95 % non-condensing
- **Altitude:** ≤ 2000 m without derating
- **Noise:** ≤ 60 dB(A) @ 1 m
- **Mounting:** Wall or floor; seismic anchoring supported

Warranty

- **Inverter:** ≥ 10 years
- **Battery ($LiFePO_4$):** ≥ 5 years, optional 10 years with capacity guarantee

Accessories & Options

- External maintenance bypass (IP65)
- AC/DC combiner boxes with SPDs
- Remote monitoring gateway (4G/5G)
- Seismic mounting base
- Spare parts kit (fans, fuses, relays)

Note: Specifications may be adjusted during detailed engineering, procurement and installation as per approval of the committee. All bidders must provide product datasheets, certificates, and type test reports for compliance

S.No.	Specifications/dimensions	Unit	Quantity
1	Supply and erection of single core PVC insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches,etc (rate for cable only):- 6mm^2 single core(For Dc Wiring)(Pakistan Cable, Newage Cable or equivalent).	Metre	100
2	Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S.conduits /PVC pipe /G.I. wire/trenches, etc. 4 core 35 mm^2 (For AC Wiring) (Pakistan Cable, Newage Cable or equivalent).	Metre	30
3	DC Wiring: High-quality stranded 99% copper wires (XLPO) appropriate diameter, standard specification, UV Resistant, tinned copper, IEC Certified. (Pakistan Cable, Newage Cable or equivalent).	Lot .As per system requirement	1
4	AC Wiring 99% copper wire of appropriate diameter as per approved specification (Pakistan Cable, Newage Cable or equivalent).	Lot .As per system requirement	1
5	P/F wall mounted DB (Distribution Board) made with 16 SWG Sheet (Recessed/Surface mounted Type), Powder coated Paint, i/c the cost of Lock, Indication lights, Thimble, Copper Comb, Wiring, Neutrals & Earth Bar, Door Earthling, Digital Voltmeter, Digital Ammeter, Volt Selector Switch, Ammeters elector switch, Current Transformers and Controls Complete in all respect as approved and directed by the Engineer Incharge (Breakers will be Paid Separately). 12" deep	Cft	10
6	Supplying, Installation and commissioning of MCB (Miniature Circuit Breaker) of specified rating made of LEGRAND FRANCE/GE U.S.A/ SCHNEIDER GERMANY / SIEMEN GERMAN/TERASAKI JAPAN/ABB SWITZERLAND or approved equivalent manufacturer in prelaid DBs and Panels i/c the cost of screws ,necessary wire complete in all respect as approved and directed by the Engineer In charge. Single Pole 6-40Amp (As required)	Nos	20
7	Providing and fixing DB/Panel accessories of required rating and size i/c copper screws of approved brand Complete in all respect as approved and directed by the Engineer Incharge. HRC Fuses With Base 63 Amp (As required.	Nos	1
8	Providing and fixing 4" deep cable tray with straight flange fabricated with perforated G.I. Sheet of 16 SWG gauge, size and depth duly wall supported/ceiling hung, supported on painted brackets of MS angle iron of 1-1/2"x1-1/2"x3/16"and MS patti of 1-1/2"x3/16"size @ 5ft C/C, hangers i/c the cost of hardware's as approved and directed by the Engineer Incharge. 9"x4" (As required)	Metre	10
9	Supply and erection of lightning arrestor horn type with 25 mm^2 cable, complete in all respects.	Nos	2
10	Providing, making & testing / commissioning of Bore type earthling point by drilling 3" dia bore hole up to water table / moist oil by laying 2" dia perforated GI. pipe (Medium Quality) fixed with 40mm dia and 250 mm long tinned coppers pike at bottom, i/c the cost of Tinned earth test link copper plate (300x50x10mm),brass nuts, spacers ,bolts washers lugs etc including the cost of copper strand Bare conductor25 mm² & manhole.as approved and directed by Engineer Incharge (Bore Type Earthling)	Job	1

11	Excavation in foundation of building bridges & other structure i/c dag belling refilling the earth around the structure in ordinary soil	Cft	619
12	Cement concrete 1:4:8 with Lawrence sand and Margalla Crush	Cft	68
13	R.C.C in raft strip foundation base slab of column cast in situ type c nominal mix 1:2:4 with Lawrence pure sand and Margalla Crush	Cft	100
14	R.C.C in roof slab beam column lintel girder cast in situ type c nominal mix 1:2:4 with Lawrence pure sand and Margalla Crush	Cft	90
15	Fabrication of mild steel reinforcement in cement concrete i/c cutting bending binding & laying in position i/c cost of binding Grade 40 steel	Kgs	120
16	Fabrication of heavy steel work, with angle tees,base plates, channels, flat iron, round iron and sheet iron for making trusses, girders, tanks etc including cutting, drilling riveting handling, welding, assembling and fixing including erection in position to withstand wind speed >150 kmph.	Kgs	1300
17	Enclosures/Cabinets for Batteries, inverters and combiner boxes	No	2
18	Supply Installation testing & commissioning of N Type Bifacial Panel Wattage 585 Watt or above (Longi, Jinko, Canadian or equivalent Top con cell type Mono perc Half cut (mono crystalline(Module Efficiency 22 % or above Open Circuit Voltage 51 volt or above, Short Circuit current 14 Ampere or above Operating temperature -40 C ~ +85 C class A Tier Quality Tier 1 Max System voltage DC 1500V Fuse rating 25 Ampere Protection class II Fire Rating UL Type 1 or 2 IEC Class C 3.2mm tempered glass frame with anti-reflection coating Aluminum Alloy Anodized Solar Junction Box IP68, 3 By Pass Diodes Cable 4mm2 (Output) with MC4 Connector preinstalled Power Output Tolerance maximum 10Watt Efficiency 10 years manufacturer &30 Years performance warranty complete in all respect as approved and directed by Engineer in Charge	Nos	36
19	Supply Installation testing & commissioning of on Grid Three phase Pure Sine Wave Hybrid Invertor of required ratings with cloud monitoring Inverex, Nitrox, Growatt, Solis, Huawei or equivalent) with MPPT Tracker 03 Nos, Min PV Strings/MPPT 02 Nos, Minimum Efficiency of 98.5% or above, Internal DC Switch and transformer-less Type II surge protection for both DC and AC Anti-PIC for PV module Multi MPPT charging module Optional AC switch AFCI function Supporting AC power supply with minimum 10 years warranty complete in all respect as approved and directed by Engineer in Charge. Not less than 8KW OR Higher	08 KW	2
20	Batteries-Lithium Iron Phosphate (LiFe PO4) or Equivalent (48 v), rated compatible with hybrid inverter. Minimum Life Cycles>6000 cycles at 80% DoD ,Depth of Discharge>90% and design life 15 years @25 Centigrade.5 years warranty extendable to 10 years .Minimum 300 ampere or higher	No.	2
21	Transportation, Net metering Documentation, Inspection & Net metering approval by Disco Bi-Directional meters & Disco Approval fee	Job	1
22	**Accessories:** PVC pipes (Adamjee/GM or equivalent), PVC-coated GI flexible pipes, thimbles, cable ties, rawal bolts, PVC slotted ducts, etc.	Job. As per system requirement	1

3. At S. NO.40 Financial Bid Form for Lot 3 is replaced with following Bill of Quantities.

Sr.	Specifications/dimensions	Unit	Quantity	Unit price	Amount(including all taxes)
1	Supply and erection of single core PVC insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches,etc (rate for cable only):- 6mm^2 single core(For Dc Wiring)(Pakistan Cable, Newage Cable or equivalent).	Metre	100		
2	Supply and erection of XLPE insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in prelaid G.I. pipe/M.S.conduits /PVC pipe /G.I. wire/trenches, etc. 4 core 35 mm^2 (For AC Wiring) (Pakistan Cable, Newage Cable or equivalent).	Metre	30		
3	DC Wiring: High-quality stranded 99% copper wires (XLPO) appropriate diameter, standard specification, UV Resistant, tinned copper, IEC Certified. (Pakistan Cable, Newage Cable or equivalent).	Lot .As per system requirement	1		
4	AC Wiring 99% copper wire of appropriate diameter as per approved specification (Pakistan Cable, Newage Cable or equivalent).	Lot .As per system requirement	1		
5	P/F wall mounted DB (Distribution Board) made with 16 SWG Sheet (Recessed/Surface mounted Type), Powder coated Paint, i/c the cost of Lock, Indication lights, Thimble, Copper Comb, Wiring, Neutrals & Earth Bar, Door Earthling, Digital Voltmeter, Digital Ammeter, Volt Selector Switch, Ammeters elector switch, Current Transformers and Controls Complete in all respect as approved and directed by the Engineer Incharge (Breakers will be Paid Separately). 12" deep	Cft	10		
6	Supplying, Installation and commissioning of MCB (Miniature Circuit Breaker) of specified rating made of LEGRAND FRANCE/GE U.S.A/ SCHNEIDER GERMANY / SIEMEN GERMAN/TERASAKI JAPAN/ABB SWITZERLAND or approved equivalent manufacturer in prelaid DBs and Panels i/c the cost of screws ,necessary wire complete in all respect as approved and directed by the Engineer In charge. Single Pole 6-40Amp (As required)	Nos	20		
7	Providing and fixing DB/Panel accessories of required rating and size i/c copper screws of approved brand Complete in all respect as approved and directed by the Engineer Incharge. HRC Fuses With Base 63 Amp (As required	Nos	1		
8	Providing and fixing 4" deep cable tray with straight flange fabricated with perforated G.I. Sheet of 16 SWG gauge, size and depth duly wall supported/ceiling hung, supported on painted brackets of MS angle iron of 1-1/2"x1-1/2"x3/16"and MS patti of 1-1/2"x3/16"size @ 5ft C/C, hangers i/c the cost of hardware's as approved and directed by the Engineer Incharge. 9"x4" (As required)	Metre	10		

9	Supply and erection of lightning arrestor horn type with 25 mm ^{2}cable, complete in all respects	Nos	2		
10	Providing, making & testing / commissioning of Bore type earthling point by drilling 3" dia bore hole up to water table / moist oil by laying 2" dia perforated GI. pipe (Medium Quality) fixed with 40mm dia and 250 mm long tinned coppers pike at bottom, i/c the cost of Tinned earth test link copper plate (300x50x10mm),brass nuts, spacers ,bolts washers lugs etc including the cost of copper strand Bare conductor25 mm² & manhole.as approved and directed by Engineer Incharge (Bore Type Earthling)	Job	1		
11	Excavation in foundation of building bridges & other structure i/c dag belling refilling the earth around the structure in ordinary soil	Cft	619		
12	Cement concrete 1:4:8 with Lawrence sand and Margalla Crush	Cft	68		
13	R.C.C in raft strip foundation base slab of column cast in situ type c nominal mix 1:2:4 with Lawrence pure sand and Margalla Crush	Cft	100		
14	R.C.C in roof slab beam column lintel girder cast in situ type c nominal mix 1:2:4 with Lawrence pure sand and Margalla Crush	Cft	90		
15	Fabrication of mild steel reinforcement in cement concrete i/c cutting bending binding & laying in position i/c cost of binding Grade 40 steel	Kgs	120		
16	Fabrication of heavy steel work, with angle tees,base plates, channels, flat iron, round iron and sheet iron for making trusses, girders, tanks etc including cutting, drilling riveting handling, welding, assembling and fixing including erection in position to withstand wind speed >150 kmph.	Kgs	1300		
17	Enclosures/Cabinets for Batteries, inverters and combiner boxes	No	2		
18	Supply Installation testing & commissioning of N Type Bifacial Panel Wattage 585 Watt or above (Longi, Jinko, Canadian or equivalent Top con cell type Mono perc Half cut (mono crystalline(Module Efficiency 22 % or above Open Circuit Voltage 51 volt or above, Short Circuit current 14 Ampere or above Operating temperature -40 C ~ +85 C class A Tier Quality Tier 1 Max System voltage DC 1500V Fuse rating 25 Ampere Protection class II Fire Rating UL Type 1 or 2 IEC Class C 3.2mm tempered glass frame with anti-reflection coating Aluminum Alloy Anodized Solar Junction Box IP68, 3 By Pass Diodes Cable 4mm2 (Output) with MC4 Connector preinstalled Power Output Tolerance maximum 10Watt Efficiency 10 years manufacturer &30 Years performance warranty complete in all respect as approved and directed by Engineer in Charge	Nos	36		
19	Supply Installation testing & commissioning of on Grid Three phase Pure Sine Wave Hybrid Invertor of required ratings with cloud monitoring Inverex, Nitrox, Growatt, Solis, Huawei or equivalent) with MPPT Tracker 03 Nos, Min PV Strings/MPPT 02 Nos, Minimum Efficiency of 98.5% or above, Internal DC Switch and transformer-less Type II surge protection for both DC and AC Anti-PIC for PV	08 KW	2		

	module Multi MPPT charging module Optional AC switch AFCI function Supporting AC power supply with minimum 10 years warranty complete in all respect as approved and directed by Engineer in Charge. Not less than 8KW OR Higher				
20	Batteries-Lithium Iron Phosphate (LiFe PO4) or Equivalent (48 v), rated compatible with hybrid inverter. Minimum Life Cycles>6000 cycles at 80% DoD ,Depth of Discharge>90% and design life 15 years @25 Centigrade.5 years warranty extendable to 10 years. Minimum 300 ampere or higher	No.	2		
21	Transportation, Net metering Documentation, Inspection & Net metering approval by Disco Bi- Directional meters & Disco Approval fee	Job	1		
22	**Accessories:** PVC pipes (Adamjee/GM or equivalent), PVC-coated GI flexible pipes, thimbles, cable ties, rawal bolts, PVC slotted ducts, etc.	Job.As per system requirement	1		
	Grand Total price in figures(including all taxes				
	Grand Total price in words (including all taxes)				