KENYA ELECTRICITY GENERATING COMPANY LIMITED
KGN-SBP-06-2018

ADDENDUM No 3

TECHNICAL SPECIFICATIONS

SCHEDULE 1:
SOLAR CARPORT GRID TIE SYSTEM

1.0 REINFORCEMENT

The proposed solar carport structure already exists. However, if there will be need for any structural reinforcement, materials used shall be of High yield tensile steel beams to BS 4461 including cutting, bending, overlaps as applicable and tying wire.

2.0 DESIGN AND ERECTION OF SOLAR CAR PORT

a) KenGen has provided general **DESIGN TEMPLATE** for the solar car port to be adopted by the Contractor in his design. Structural design and adequacy of all structural members has already been done.
   - Refer to drawing (Appendix 1-attached) for a structural description of the existing structure.

TYPICAL DESIGN TEMPLATES

b) Contractor shall take note of all parameters for the existing infrastructure that will influence the design of the solar car port

c) **GUARANTEE: -** Contractor shall provide Min 2 Years warranty and guarantee for all installations

3.0 Grid-Tie System

The solar car port shall provide a solar grid tie solution to power the hydro plaza building. The following is a description of the grid tie system to be installed:

ITEM	DESCRIPTION	REQUIREMENT/ SPECIFICATION	BIDDER'S RESPONSE
1.	**System Design, Sizing, Supply, Installation, Testing and Commissioning of the grid tie solar car port system for the hydro plaza carport**	The solution provider shall describe and provide the whole setup infrastructure layout, design, sizing calculations and implementation methodology to be used. The bidder shall come up with a complete design based on the data collected from the site visit. The system sizing shall be based on the available space on the roofs of the parking.	

		The bidder shall submit the following documents to clearly show how he/she intends to implement the grid tie solution for the Hydro Plaza Solar Car port:	
		Schematic drawing clearly showing how the solution shall be set up. The schematic shall be accompanied by proper system sizing based on data collected during site visit and the roof space. The bidder shall clearly show his/her calculations for the grid tie inverter and PV sizing and give a justification of the solution he/she intends to provide.	
		The bidder shall provide a step by step method statement on how the works shall be implemented. The work plan shall have time lines shown in a gant chart.In addition, the method statement shall be accompanied by work safety procedure and competency of staff who shall carry out the works	
		*The minimum acceptable competency of the team lead shall be **ERC Solar PV License of Class T3** certification. The license of the team lead shall be part of the documents submitted. The team lead is expected to be available at all times during implementation of the project. There shall also be assistant with the same qualifications that shall stand in for the team lead in the event He/ She is unavailable to ensure continuity of the work.*	
		*The bidder shall also have a company registered with ERC with authority to carry out such works as described in this schedule with at least class **C1 as the minimum acceptable.***	
Only bidders who give a practical proposal shall be considered for the works.			

2.	**Grid Tie Inverter Requirements**	Inverter Requirements :	
		The grid tie system shall be an intelligent system with inverters that are interactive and can promptly synchronize with the grid or any simulation signal of the grid as required.	
		The inverter shall have a protection system from surges that may occur both from the grid and the PV system	
		The inverter shall have an LCD screen that clearly indicates parameters of the grid and the PV system (voltage, current, power). At any one time, the inverter shall also be able to clearly display energy produced by the PV panels and real time consumption.	
		The grid tie inverter shall have communication system such that it can be monitored remotely in real time through web based software	
		The inverter shall be programmable to specific grid parameters. In addition, KenGen seeks to have a smart system that can intelligently coordinate the grid supply/or any other simulation of the grid e.g. diesel generator and solar PV supply to give optimum output based on consumption at any one particular time. Ability of the inverter to smartly match the available sources of supply to the consumption shall be mandatory. The bidder is required to demonstrate the abilities of the inverter and its software in a detailed datasheet	
		The inverter shall have an efficiency of equal to or greater than 98%.	

		The bidder shall clearly indicate the type of inverter to be provided. Data sheets and catalogues of the grid tie inverter provided shall accompany this document	
		Inverter Software:	
		The inverter software shall be interactive and easy to use. It shall be capable of troubleshooting the inverter and give error codes that can guide the user in finding solutions.	
		The inverter software shall be able to log events which shall be retrievable from time to time remotely and onsite.	
		The software shall have technical support from the manufacturer and upgradable from time to time for the purpose of improvement of its functionality. The upgrading of the software shall be free.	
		The software shall have an expert system that is able to analyze operating parameters and respond accordingly based on threshold conditions set for operation. It shall have diagnostic tools that can assess errors and give a conclusive finding that can be used to make further recommendation	
		The software shall come with one communication device/laptop. The device shall have a windows10 operating system, core i7processor with 4 GB ram, HDD of 500GB with a screen size of 13' max.	
3.	**Solar PV Requirements**	The Bidders shall supply PV Modules with sufficient capacity to adequately supply the office load for the hydro plaza complex. Calculation of the load rating shall be clearly indicated in the proposal provided for the grid tie solution	
		PV module type:	

		Shall be of monocrystalline or polycrystalline and if framed, the frame shall be anodized aluminum.	
		Panel efficiency: *Shall **not** be less than 15%*	
		Connectors: *The panel shall come with standard connectors and blocking diodes.*	
		Power degradation: *The warranty period for the PV Module must be at least 10 years against a maximum 10% reduction and 20 years against a maximum 20% reduction of output power at STC.)*	
		Mounting Module Material: *Material of the Module Mounting support Structure for the panels shall be **Non corrosive**.* *The bidder is expected to analyze the mounting surface and come up with appropriate mounting mechanism of the panel and mounting brackets suitable for a firm support.* *The specific area of mounting shall be shown during site visit.*	
		Data sheet for the specifications of the panel clearly indicating the module's V_{oc}, V_{mp}, I_{sc} $I_{mp,}$ thermal coefficient and efficiency shall be attached.	
4.	**System Interface**	The bidder shall be required to interface the new solar energy system to the existing power system.	
5.	**System Protection**	The Bidder shall design a protection scheme for the new system and integrate it with the existing protection scheme.	
6.	**Special tools**	• The bidder shall supply special tools to KenGen necessary for operation and maintenance of the system. • The bidder shall furnish the client with a list of recommended tools and spares. These shall be included in the bid.	
5.	**Training**	The bidder shall facilitate an on-site and offsite training to be done to technical staff.	

		The on-site training shall be done to 10 technical staff and shall include operation and maintenance of the whole system. Offsite training shall be conducted to 5 technical staff. It shall be structured to provide both theoretical and practical content adequate for T3 certification. The training shall be conducted in a certified institution and a course content shall be attached to this document *(Name of institution to carry out training must be attached together with relevant documents to ascertain their certification to carry out such trainings.)* .	
6.	**Motion Sensors**	Motion sensors shall be installed in all common areas. The Sensor shall have an integrated daylight sensor so that lights will be turned on when necessary based on the existing light intensity that is naturally allowed into the building. The detection range of the motion sensor shall be a radius of 3M in open space and can comfortably function at a mounted height of 3 M. It shall be able to operate at a temperature range of 10^{o}c to 55^{o}C	

SCHEDULE II:
SOLAR STREET LIGHTING FOR THE HYDRO PLAZA OFFICE BLOCK

ITEM	DESCRIPTION	REQUIREMENT/ SPECIFICATION	BIDDER'S RESPONSE
1.	**Integrated Solar Street Light**	Manufacturer	
		Model or Brand	

		Luminous Efficacy (*The light shall be LED with a rating of at least 50 W. (At least 120 Lumens /watt).*	
		Chip technology (*Shall be of Cree or its equivalence technology).* A datasheet shall be attached to verify the chip technology.	
		Solar Panel *(The solar panel shall be Monocrystalline or polycrystalline).*	
		Battery (*The LED lamp set shall have a battery rating that can sustain its operation for at least 2 days (2 days of autonomy*).	
		LED Illumination *(Each lamp shall be greater than 0.5 Lux/watt perpendiculars from the height of 9m or correlated). The beam angle shall be equal 120^0 (+/- 10^0).* *The life span of the LED bulb shall operate for a minimum of Minimum of 25,000 hours or 5 years*)	
		CRI/CCT (*Each LED must have a CRI greater than 70 and the color temperature must be at least 5000K*)	
		Control system (*The lighting system shall have automatic dusk to dawn function. It shall include diming function which brightens up when it senses motion.)*	
		Protection - Protection against adverse conditions. (*The lamp shall be of IP65 degree of protection*). Compliance certificate must be attached.	
		Warranty (*The Lamp shall come with a warranty of Shall be 5 years*)	
2	**Street Light Pole**	Type of Pole	

		(The poles shall be of Hot Galvanized steel with minimum DFT of 80 micron).	
		Height of Pole *(The height of the pole shall be at least 8meters from the base).*	
		Pole Thickness *(The bidder shall calculate the pole thickness based on the load of the lighting fixture. However, it shall not be less than 4mm).*	
		Pole Diameter *(The bidder shall calculate and state the diameter of the poles. The base of the pole shall fit to the existing foundation base at site.* Foundation *Where a foundation base does not exist, the bidder shall construct a concrete one measuring 1000mm*1000mm*1000mm with 700mm being below ground level)*	
		Inspection (*The client shall inspect the poles before shipment to site to ascertain the quality of poles manufactured. The bidder shall provide all necessary equipment for the said inspection*)	
3	**Specialized tools**	The bidder shall hand over to KenGen all specialized tools necessary for operation and maintenance of the street lights.	
4	**Training**	The bidder shall facilitate an on-site training to be done to 10 technical staff and shall include operation and maintenance of the whole system.	

SECTION VI

SCHEDULE I: GRID - TIE SYSTEM FOR HYDRO PLAZA OFFICE BLOCK

Item	Description	Quantity	UoM	Rate (KSH)	VAT	Amount (KSH)
1	System Design and Sizing.	AU	AU			
2.	Supply of equipment (please itemize each equipment to be supplied)		PCS			
3.	Installation ,testing and commissioning	AU	AU			
4.	Motion Sensors	15	PCS			
5.	Operation and maintenance - Onsite training	10	Pax			
6.	Offsite training for T3 Licensing	5	Pax			
	TOTAL					

***Pricelist shall be comprehensive based on design and shall all inclusive of works and logistics.**

TENDERER'S NAME: _____

TENDERER'S SIGNATURE_____

COMPANY'S RUBBER STAMP_____

DELIVERY PERIOD_____

WARRANTY PERIOD_____

SCHEDULE II: SOLAR STREET LIGHTING FOR HYDRO PLAZA OFFICE BLOCK

Item	Description	Quantity	UoM	Rate (KSH)	VAT	Amount (KSH)
1	Supply of Integrated solar street light	45	Pcs			
2	Supply of poles(This shall include any civil works where necessary)	45	Pcs			
3	Installation, testing and commissioning of the solar street light	45	Pcs			
4	Operation and maintenance Onsite training	10	Pax			
	TOTAL					

***Pricelist shall be comprehensive based on design and shall be inclusive of works and logistics.**

TENDERER'S NAME: _____

TENDERER'S SIGNATURE_____

COMPANY'S RUBBER STAMP_____

DELIVERY PERIOD_____

WARRANTY PERIOD_____

ACKOWLEDGEMENT OF ADDENDUM 3

We, the undersigned hereby certify that the Addendum is an integral part of the document and has been incorporated in the tender document.

Signed ……

Tenderer: ……

Date ……