



Kenya Power

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Our Ref. KP1/6D.4/PT/1/17/HK/omm

24th May, 2017

Dear Sir/ Madam

ADDENDUM NO.1 - TENDER NO. KP1/6D.4/PT/1/17/A01 FOR PROCUREMENT OF PLANT – SUPPLY, INSTALLATION AND COMMISSIONING OF 550KW SOLAR PLANT – KENYA ELECTRICITY EXPANSION PROJECT (KEEP)

1. RELATIONSHIP WITH THE PRINCIPAL TENDER DOCUMENT.

Save where expressly amended by the terms of this Addendum, the Principal Tender Document shall continue to be in full force and effect.

The provisions of this Addendum shall be deemed to have been incorporated in and shall be read as part of the Principal Tender Document.

2. CLARIFICATIONS TO TENDER

- a) Clause 3.2 (Section III) – ‘Requirement of Average Annual Turnover of US\$.6.25 Million’ has been amended to ‘*Average Annual Turnover of US\$.2.4 Million*’
- b) Clause 4.2(a) (Section III) – ‘Requirement of at least 2No. contracts with a value of at least US\$.2.0 Million’ has been amended to ‘*1No. contract with a value of at least US\$.1.5 Million*’
- c) The following responses are made to clarifications sort on various issues in the Tender document for procurement of Plant – Supply, Installation and Commissioning Of 550kw Solar Plant at Lodwar – Kenya Electricity Expansion Project (Keep) and shall be deemed to form the Addendum.

| Item No. | Query by Bidders | KPLC Responses |
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| 1 | <p>Page 117-122 – Technical Schedules & Specifications: Clause 4.1 & 4.4.3, Power Conversion system specifications / PV Inverters:</p> <p>a. As mentioned in this document, you are looking for a single Power Conversion Unit (PCU) of 400 KVA or higher capacity. And you are looking at high reliability of this system</p> | <p>That is not correct to state that we are looking for a single PCU of 400 KVA. It is stated in the requirements that the converter system should be designed to use equally sized units in parallel. We are looking at high reliability.</p> |
| | <p>b. Also we understand that the site has 6 Diesel Gensets of 400 KVA each, running in parallel (based on the station load)</p> | <p>Yes, the station has 6 gensets currently that are connected to the system but it could change because we have provision of 8 gensets.</p> |
| | <p>c. There are a few technical challenges – namely the capacity of this central PCU of 400 KVA running in parallel with a set of 400 KVA gensets (and its impact on overall impedance and harmonics)</p> | <p>We don't see any challenge if the design is right.</p> |
| | <p>d. To overcome this, and to ensure NO BLACKOUT of this Solar Power station, we request you kindly consider the usage of String Inverters / smaller size inverters (converters) to be run in parallel (totalling over 400 KVA).</p> | <p>String inverters are allowed because it is a modular system.</p> |
| | <p>e. Multiple String inverters (totalling 500 KVA) would give better conversion efficiency (owing to multiple MPPT and hence less module mismatch losses) and also higher system reliability, and ease of operation / maintenance and synchronization with the existing 400 KVA gensets</p> | <p>Follow the specifications in the document.</p> |
| | <p>f. Requesting your valuable approval for considering String Inverters / smaller inverters (converters) for this tender</p> | <p>Okay</p> |
| 2 | <p>Page 118 - 119, Clause 4.3 – Battery – Electrical and Functional Requirements</p> | |
| | <p>a. The tender calls for battery bank with at least 400 KWH (C-1 rate) storage</p> | <p>Yes</p> |
| | <p>b. Kindly do let us know whether this is C-1 rate or C-10 Rate, as both are different and have severe price implications</p> | <p>C-1 rate is required</p> |
| | <p>c. Also, please let us know whether the Battery Inverters are expected to be of 400KVA capacity, to cater to a spinning reserve of nominal 400KVA in the system (and 150% - which is 600 KVA for the 30 seconds' period)</p> | <p>Yes</p> |
| | <p>d. Battery Warranty – 10-year warranty for battery is difficult and expensive. Kindly consider 5 years warranty for the battery and inverters</p> | <p>10-year warranty required</p> |

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| 3 | Page 120 – 121 – Clause 4.4.2 – PV Modules a. Kindly consider power warranty of 90% nominal power warranty in 10 years and 80% Nominal power warranty in 25 years | Not acceptable. 30 years is required |
| | b. Please consider Front Panel as Glass and back panel of Tedlar (instead of Glass to Glass PV modules) | Please state your offer on the provided column for tenderer's detail |
| 4 | Page 117 – 118 – Clause 4.2 - Connection Transformer | |
| | a. Kindly permit the connection transformer to have a primary voltage as per the solar inverter / power converter (instead of specifying 400V standard) | Please comply |
| | b. The secondary shall have the 11KV as per the interconnection voltage requirement | Okay |
| | c. Also please let us know whether this transformer needs to have the OLTC (On Load Tap Changer arrangement) or we can use the normal OFF LOAD tap changer. | The transformer shall be one with Off load tap changer with 5 taps and tap 3 as the nominal tap. |
| | d. Can we use Outdoor duty ONAN type transformer for this application? | Yes |
| | e. What vector group would be needed – DYN11 is the standard vector group used for generation transformers – can we use the same, please | Yes |
| 5 | Battery Room / Civil Construction – It would be helpful if KPLC can provide a drawing with broad specifications of the Container / Room / Fence etc., to enable all bidders quote uniformly | 20ft Standard container with weather proofing inside and specifications stated under clause 4.3 is sufficient. |
| 6 | Can you kindly provide us the SLD for the existing LODWAR power station – this will help in synchronization arrangements, system impedance, interconnection cable and transformer selection, based on the fault levels permitted at your bus bar | Single line diagram is provided |
| 7 | Kindly provide Location of the Plant – Google map will also work | Lodwar location 3° 6' 41.64N 35° 36' 26.99E |
| 8 | Project details – (Is the system Ground Mounted or Rooftop) | Ground mounted |
| 9 | Battery backup (Pl specify 'storage in hours') | The battery is principally for stabilization and not for storage |
| 10 | Site Lay out plan | Provided |
| 11 | Mounting structure drawing. Please specify. | It is the responsibility of bidder to do the structure |
| 12 | Distance from PV module to Inverter /Control room | That is the responsibility of the bidder |
| 13 | Please confirm that payment shall be made through Letter of credit | No letter of credit |

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| 14 | <p>We have noted that the load profile in Lodwar is now about approximately 1700KW, the solar project requires an installation of about 550kwp PV modules.</p> <p>the system require that a grid tied inverter be installed of 90% of PV array STC power = 490kWp and power system convertor (battery convertor) of 320 KW.as per the page 115 system design and how they interact: Design No.1 and others</p> <p>In our view, it means the battery shall be absorbing 80% from PV modules and may be about 20% or less shall be through the Grid tied inverter.</p> <p>What is the purpose of storing the power in the battery and release it during the night when the demand is 1700KW</p> | <p>The battery is for grid stabilisation, peak shaving and production shifting- page 116 of the tender document</p> |
| 15 | <p>What is the sense of this high cost of battery in a system that can work without battery because of the current power demand of 1700KW with 550kw solar is not anywhere close to destabilise the system</p> | <p>The functions of battery have already been stated in page 116</p> |
| 16 | <p>Since there is step up transformer (0.415/11kV) in this system, then it means there shall be an air breaker switch after transformer to 11kV LV line onto the grid as this cannot go through the busbar. The situation at Lodwar the busbar voltage level is 415V and 11KV comes after TX.</p> | <p>That is correct</p> |
| 17 | <p>This means that you cannot terminate 11kV after TX to the busbar of 415V.?</p> | <p>Yes</p> |
| 18 | <p>Who shall provide the provision for onward transmission of power after transformer?</p> | <p>The bidder shall provide for the required cabling and terminations</p> |
| 19 | <p>On page 115 there is 4 system design which show how the system work. Is it the system design to be adopted or one can come up with his own design?</p> | <p>Yes. The system should work as stated in the document on page 115</p> |
| 20 | <p>On storage battery. Which proven working technology of battery that can run for 20 years as even the lithium battery are still under test designed to run for 10 years?</p> | <p>The specification of the battery shall remain unchanged. Bidders can specify on the provided column their offer</p> |
| 21 | <p>What are the payment terms?</p> | <p>The payment terms are as per GC clause 14 and PC Sub-clauses 14.2, 14.2(b),14.3, 14.5(b)(i) 14.5(c)(i), and 14.6</p> |
| 22 | <p>What is the rating of current solar system on site?</p> | <p>60 kW, direct feed without batteries</p> |
| 23 | <p>How is site visit planned?</p> | <p>Daily direct flights are available. KPLC Staff on site will be available to take the bidders around the site.</p> |
| 24 | <p>Isn't 10% allowance for sub-contracting too little? (Page 32; clause 34.4)</p> | <p>10% is okay.</p> |

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| 25 | How will taxes be treated? | Include all taxes in the bid price |
| 26 | What is the extent of civil work required e.g. offices etc.? | Civil works required are those necessary to secure firmly and safely all equipment required for the system. Site office is also required as stated with required area in pg. 103 |
| 27 | Past experience of at least 50kW solar system installation too demanding for locals (Page 41; 4.2(b)) | Bidders should comply |
| 28 | Specify type of batteries required | Check tender document page 117 (Technical schedules and specs) clause 4.3 |
| 29 | What information is required under Page 62 (Technical Proposal)? | Narration of company's business/structures including organization charts etc. |
| 30 | Inverter warranty of 10years too high (Page 121 – 122, clause 4.4.3) | State your offer on the column provided |
| 31 | Warranty requirements for Solar Electricity Photo Voltaic System (PV) too high (page 120, 121, clause 4.4.2) | Comply- State your offer on the column provided |
| 32 | Can contractor arrange finance in case NDF funding is inadequate? | NO |
| 33 | What will be primary source of power at Lodwar, Solar or Gensets? | Gensets |
| 34 | Can more drawings be provided with respect to system design? | No more drawings other than single line diagram for existing system will be provided |
| 35 | Details insufficient for Bill of Quantities Page 53 - 61 | Details of BOQ provided are sufficient |
| 36 | Clarify form PER-2 Page 69 on resumes of proposed personnel | These are CVs/Curriculum Vitae |
| 37 | Who will assist bidders for site meetings? | See ITB 7.1, Page 29 |
| 38 | Qualification criteria 3.1 & 3.2 too high for local bidders | Addendum to be issued |
| 39 | Site visit mandatory? | See Pages 29 & 30 ITB7.4 |
| 40 | Kindly advise on whether there is any specified mandatory civil work scope required by this tender? | Mandatory civil works required are those necessary to secure firmly and safely all equipment required for the system |
| 41 | Kindly provide more details for the terms of payment | The payment terms are as per GC clause 14 and PC Sub-clauses 14.2, 14.2(b),14.3, 14.5(b)(i) 14.5(c)(i), and 14.6 |
| 42 | What is the exact scope of the solar plant project, the 11kV underground cable up to the pole and 11kV switch will be included or not? | 11kV cable up to the pole and 11kV switch should be included |
| 43 | “All components shall be installed in 20 feet containers”. Does this mean that PCS and battery | Except for PV arrays, all other equipment like battery, PCS, |

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| | use only one container? And what about PV system, use another container? | inverter, converter and transformer will each be installed in 20 feet containers |
| 44 | “Battery system rated energy shall be at least 400kWh (C1 rate, room temperature)”does the battery type have any specific requirements? | The battery should be suitable for the hybrid cycling application stated in the document |
| 45 | No specific micro grid functional requirements in bidder document, kindly provide. | The micro-grid supply power to a medium voltage electricity distribution network supplying customers mainly for domestic and small commercial activities. Refer to single line diagram |
| 46 | According to the technical document and design diagram the system is grid connected, while the experience is mentioned for 50kWp off-grid. Kindly clarify. | The grid referred to in the diagram is a mini-grid system which is off-grid. Refer to single line diagram. |
| 47 | Kindly provide the layout-drawing for proposed site. | It has been provided |
| 48 | Kindly confirm the type of battery | Refer to clause 4.3 pg.118 on technical schedules and specification for battery. |
| 49 | Please make sure whether the works of soil investigation and topographic survey are included in the subject. | It is the responsibility of the bidder to do the required investigations required for the project during site visit. |
| 50 | Please clarify what kind of civil works are included in this subject except container foundations and mounting structures e.g. road, fence, buildings | Civil works are for container foundations and mounting structures. |
| 51 | Is there any preference about central type inverter or string inverter? | Being a modular system, a string inverter system would be preferable. |
| 52 | Please clarify the connection method between PV and BESS plant and power grid. Please clarify if using one 11kV feeder. If yes, please clarify the connection cable or OHL is in the scope or not. | The connection between PV and battery ESS will be to 11kV feeder. The scope of works includes provision of the required cable with proper terminations. |
| 53 | It will be a grid-connected solar system or off-grid solar system? | It is an Off-grid solar system |
| 54 | Except PV arrays, all other equipment like battery, PCS, inverter, converter and transformer will be installed in 20 feet containers? | Yes |
| 55 | Which type of battery is required, lithium battery, lead-acid battery or gel type battery? | The battery required has not been specified but should meet the requirements specified in clause 4.3 pg.118 on technical schedules and specification for battery. |
| 56 | Can we choose such type of solar module as below? Glass-glass construction without aluminium frames (because double glass solar module doesn't need | The requirements are specified in clause 4.4.2 pg.120 on technical schedules and specification for |

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| | such frame at all), 72 series-connected multi-crystalline cells with 5 busbars, front glass 2.5mm tempered high transmission solar glass and Back glass 2.5mm tempered back glass. | Photovoltaic Modules. Specify your offer in the column provided after specifications. |
| 57 | The solar system will be installed on ground? Please kindly let us know the geological condition of ground. | The structures to hold solar systems are required to be ground mounted. It is responsibility of each bidder to visit site to assess the requirements for proper design. |
| 58 | Solar Module: The international standard power warranty period now for 80% of nominal power is 20 years, not 30 years, please clarify. | That is our requirements but you can specify your offer in the column provided after specifications. |
| 59 | It is required that PV inverters shall be based on 3-phase transformer less topology, but there are some requirements of transformer mentioned in the technical schedules and specifications. Please clarify | The transformer specified is the step-up transformer 0.415/11kV |
| 60 | Please let us know more information about the loads, such as the total power of loads, the input voltage of loads, etc. | The current maximum power demand is approximately 1700 kW. The voltages of loads are 240V and 415 V. |
| 61 | Can you confirm that grid voltage connection will be in 11KV and not 400V | The grid voltage is 11,000V |
| 62 | The dimensioning of the PCS requires knowing the consumption load profile. Could you communicate us this profile | Load profile is attached (Appendix 1) |
| 63 | Should the site be fenced | The site where the PV panels are to be installed is already fenced |
| 64 | Will there be a separate feeder for the new solar plant, if no, which feeder line will we connect the new system | there will be no separate feeder for the solar plant. The plant will be connected to the town feeder |
| 65 | Will the contractor be liable to connection to the grid? If so, could you please share technical specifications of recommended Auto re closures and Circuit breakers | the contractor will be liable for connection to the grid. Technical specs of auto-reclosers provided (Appendix 2) |
| 66 | Could you please clarify the defects liability period | under PC Part A-Sub-clause 1.1.3.7 defects liability period is 365 days |

All other terms and conditions remains as per the tender document.

Yours faithfully,

For: KENYA POWER & LIGHTING COMPANY LIMITED.


BERNARD NGUGI
GENERAL MANAGER, SUPPLY CHAIN

