

INVITATION TO BID

GP 600409-1 ITB to develop multiple Long Term Agreements for Lithium Ion based Energy Storage Systems and PV Lighting Kits

UNDP GLOBAL, administrated by UNDP Procurement Support Unit



United Nations Development Programme

March, 2017

Section 1. Letter of Invitation

Copenhagen, DK
March 31, 2017

LONG TERM AGREEMENT for Lithium Ion based Energy Storage Systems

Dear Mr./Ms.:

The United Nations Development Programme (UNDP) hereby invites you to submit a Bid to this Invitation to Bid (ITB) for the above-referenced subject.

This ITB includes the following documents:

- Section 1 – This Letter of Invitation
- Section 2 – Instructions to Bidders (including Data Sheet)
- Section 3 – Schedule of Requirements and Technical Specifications
- Section 4 – Bid Submission Form
- Section 5 – Documents Establishing the Eligibility and Qualifications of the Bidder
- Section 6 – Technical Bid Form
- Section 7 – Price Schedule Form
- Section 8 – Contract template, including General Terms and Conditions

Your offer, comprising of a Technical Bid and Price Schedule, together in a sealed envelope, should be submitted in accordance with Section 2.

You are kindly requested to submit an acknowledgment letter to UNDP to the following addresses:

United Nations Development Programme
Mettelena.herring
Mettelena.herring@undp.org
GPUcree@undp.org

The letter should be received by UNDP no later than **Close of Business, 10th April, 2017 (CPH time)**. The same letter should advise whether your company intends to submit a Bid. If that is not the case, UNDP would appreciate your indicating the reason, for our records.

If you have received this ITB through a direct invitation by UNDP, transferring this invitation to another firm requires notifying UNDP accordingly.

Should you require any clarification, kindly communicate with the contact person identified in the attached Data Sheet as the focal point for queries on this ITB.

UNDP looks forward to receiving your Bid and thanks you in advance for your interest in UNDP

procurement opportunities.

Yours sincerely,

Mettelena Herring

Procurement Services Unit
Office of Sourcing and Operations
Bureau for Management Services
United Nations Development Programme
Marmorvej 51, 2100 Copenhagen,
Denmark

Section 2: Instruction to Bidders

Definitions

- a) *"Bid"* refers to the Bidder's response to the Invitation to Bid, including the Bid Submission Form, Technical Bid and Price Schedule and all other documentation attached thereto as required by the ITB.
- b) *"Bidder"* refers to any legal entity that may submit, or has submitted, a Bid for the supply of goods and provision of related services requested by UNDP.
- c) *"Contract"* refers to the legal instrument that will be signed by and between the UNDP and the successful Bidder, all the attached documents thereto, including the General Terms and Conditions (GTC) and the Appendices.
- d) *"Country"* refers to the country indicated in the Data Sheet.
- e) *"Data Sheet"* refers to such part of the Instructions to Bidders used to reflect conditions of the tendering process that are specific for the requirements of the ITB.
- f) *"Day"* refers to calendar day.
- g) *"Goods"* refer to any tangible product, commodity, article, material, wares, equipment, assets or merchandise that UNDP requires under this ITB.
- h) *"Government"* refers to the Government of the country where the goods and related services provided/rendered specified under the Contract will be delivered or undertaken.
- i) *"Instructions to Bidders"* refers to the complete set of documents which provides Bidders with all information needed and procedures to be followed in the course of preparing their Bid
- j) *"ITB"* refers to the Invitation to Bid consisting of instructions and references prepared by UNDP for purposes of selecting the best supplier or service provider to fulfil the requirement indicated in the Schedule of Requirements and Technical Specifications.
- k) *"LOI"* (Section 1 of the ITB) refers to the Letter of Invitation sent by UNDP to Bidders.
- l) *"Material Deviation"* refers to any contents or characteristics of the bid that is significantly different from an essential aspect or requirement of the ITB, and (i) substantially alters the scope and quality of the requirements; (ii) limits the rights of UNDP and/or the obligations of the offeror; and (iii) adversely impacts the fairness and principles of the procurement process, such as those that compromise the competitive position of other offerors.
- m) *"Schedule of Requirements and Technical Specifications"* refers to the document included in this ITB as Section 3 which lists the goods required by UNDP, their specifications, the related services,

activities, tasks to be performed, and other information pertinent to UNDP's receipt and acceptance of the goods.

- n) "*Services*" refers to the entire scope of tasks related or ancillary to the completion or delivery of the goods required by UNDP under the ITB.
- o) "*Supplemental Information to the ITB*" refers to a written communication issued by UNDP to prospective Bidders containing clarifications, responses to queries received from prospective Bidders, or changes to be made in the ITB, at any time after the release of the ITB but before the deadline for the submission of Bid.

A. GENERAL

1. UNDP hereby solicits Bids as a response to this Invitation to Bid (ITB). Bidders must strictly adhere to all the requirements of this ITB. No changes, substitutions or other alterations to the rules and provisions stipulated in this ITB may be made or assumed unless it is instructed or approved in writing by UNDP in the form of Supplemental Information to the ITB.
2. Submission of a Bid shall be deemed as an acknowledgement by the Bidder that all obligations stipulated by this ITB will be met and, unless specified otherwise, the Bidder has read, understood and agreed to all the instructions in this ITB.
3. Any Bid submitted will be regarded as an offer by the Bidder and does not constitute or imply the acceptance of any Bid by UNDP. UNDP is under no obligation to award a contract to any Bidder as a result of this ITB.
4. UNDP implements a policy of zero tolerance on proscribed practices, including fraud, corruption, collusion, unethical practices, and obstruction. UNDP is committed to preventing, identifying and addressing all acts of fraud and corrupt practices against UNDP as well as third parties involved in UNDP activities. (See http://www.undp.org/about/transparencydocs/UNDP_Anti_Fraud_Policy_English_FINAL_june_2011.pdf and http://www.undp.org/content/undp/en/home/operations/procurement/procurement_protest/ for full description of the policies)
5. In responding to this ITB, UNDP requires all Bidders to conduct themselves in a professional, objective and impartial manner, and they must at all times hold UNDP's interests paramount. Bidders must strictly avoid conflicts with other assignments or their own interests, and act without consideration for future work. All Bidders found to have a conflict of interest shall be disqualified. Without limitation on the generality of the above, Bidders, and any of their affiliates, shall be considered to have a conflict of interest with one or more parties in this solicitation process, if they:
 - 5.1 Are, or have been associated in the past, with a firm or any of its affiliates which have been engaged UNDP to provide services for the preparation of the design, Schedule of

- Requirements and Technical Specifications, cost analysis/estimation, and other documents to be used for the procurement of the goods and related services in this selection process;
- 5.2 Were involved in the preparation and/or design of the programme/project related to the goods and related services requested under this ITB; or
- 5.3 Are found to be in conflict for any other reason, as may be established by, or at the discretion of, UNDP.

In the event of any uncertainty in the interpretation of what is potentially a conflict of interest, Bidders must disclose the condition to UNDP and seek UNDP's confirmation on whether or not such conflict exists.

6. Similarly, the following must be disclosed in the Bid:

- 6.1 Bidders who are owners, part-owners, officers, directors, controlling shareholders, or key personnel who are family of UNDP staff involved in the procurement functions and/or the Government of the country or any Implementing Partner receiving the goods and related services under this ITB; and
- 6.4 Others that could potentially lead to actual or perceived conflict of interest, collusion or unfair competition practices.

Failure of such disclosure may result in the rejection of the Bid.

7. The eligibility of Bidders that are wholly or partly owned by the Government shall be subject to UNDP's further evaluation and review of various factors such as being registered as an independent entity, the extent of Government ownership/share, receipt of subsidies, mandate, access to information in relation to this ITB, and others that may lead to undue advantage against other Bidders, and the eventual rejection of the Bid.
8. All Bidders must adhere to the UNDP Supplier Code of Conduct, which may be found at this link: <http://web.ng.undp.org/procurement/undp-supplier-code-of-conduct.pdf>

B. CONTENTS OF BID

9. Sections of Bid

Bidders are required to complete, sign and submit the following documents:

- 9.1 Bid Submission Cover Letter Form (see ITB Section 4);
- 9.2 Documents Establishing the Eligibility and Qualifications of the Bidder (see ITB Section 5);
- 9.3 Technical Bid (see prescribed form in ITB Section 6);
- 9.4 Price Schedule (see prescribed form in ITB Section 7);
- 9.5 Bid Security, if applicable (if required and as stated in the DS nos. 9-11, see prescribed Form in ITB Section 8);
- 9.6 Any attachments and/or appendices to the Bid (including all those specified under the **Data Sheet**)

10. Clarification of Bid

- 10.1 Bidders may request clarification of any of the ITB documents no later than the number of days indicated in the **Data Sheet** (DS no. 16) prior to the Bid submission date. Any request for clarification must be sent in writing via courier or through electronic means to the UNDP address indicated in the **Data Sheet** (DS no. 17). UNDP will respond in writing, transmitted by electronic means and will transmit copies of the response (including an explanation of the query but without identifying the source of inquiry) to all Bidders who have provided confirmation of their intention to submit a Bid.
- 10.2 UNDP shall endeavor to provide such responses to clarifications in an expeditious manner, but any delay in such response shall not cause an obligation on the part of UNDP to extend the submission date of the Bid, unless UNDP deems that such an extension is justified and necessary.

11. Amendment of Bid

- 11.1 At any time prior to the deadline for submission of Bid, UNDP may for any reason, such as in response to a clarification requested by a Bidder, modify the ITB in the form of a Supplemental Information to the ITB. All prospective Bidders will be notified in writing of all changes/amendments and additional instructions through Supplemental Information to the ITB and through the method specified in the **Data Sheet** (DS No. 18).
- 11.2 In order to afford prospective Bidders reasonable time to consider the amendments in preparing their Bid, UNDP may, at its discretion, extend the deadline for submission of Bid, if the nature of the amendment to the ITB justifies such an extension.

C. PREPARATION OF BID

12. Cost

The Bidder shall bear any and all costs related to the preparation and/or submission of the Bid, regardless of whether its Bid was selected or not. UNDP shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the procurement process.

13. Language

The Bid, as well as any and all related correspondence exchanged by the Bidder and UNDP, shall be written in the language (s) specified in the **Data Sheet** (DS No. 4). Any printed literature furnished by the Bidder written in a language other than the language indicated in the **Data Sheet**, must be accompanied by a translation in the preferred language indicated in the **Data Sheet**. For purposes of interpretation of the Bid, and in the event of discrepancy or inconsistency in meaning, the version translated into the preferred language shall govern. Upon conclusion of a contract, the language of the contract shall govern the relationship between the contractor and UNDP.

14. Bid Submission Form

The Bidder shall submit the Bid Submission Form using the form provided in Section 4 of this ITB.

15. Technical Bid Format and Content

Unless otherwise stated in the **Data Sheet** (DS no. 28), the Bidder shall structure the Technical Bid as follows:

- 15.1 Expertise of Firm/Organization – this section should provide details regarding management structure of the organization, organizational capability/resources, and experience of organization/firm, the list of projects/contracts (both completed and on-going, both domestic and international) which are related or similar in nature to the requirements of the ITB, manufacturing capacity of plant if Bidder is a manufacturer, authorization from the manufacturer of the goods if Bidder is not a manufacturer, and proof of financial stability and adequacy of resources to complete the delivery of goods and provision of related services required by the ITB (see ITB Clause 18 and DS No. 26 for further details). The same shall apply to any other entity participating in the ITB as a Joint Venture or Consortium.
- 15.2 Technical Specifications and Implementation Plan – this section should demonstrate the Bidder's response to the Schedule of Requirements and Technical Specifications by identifying the specific components proposed; how each of the requirements shall be met point by point; providing a detailed specification and description of the goods required, plans and drawings where needed; the essential performance characteristics, identifying the works/portions of the work that will be subcontracted; a list of the major subcontractors, and demonstrating how the bid meets or exceeds the requirements, while ensuring appropriateness of the bid to the local conditions and the rest of the project operating environment during the entire life of the goods provided. Details of technical bid must be laid out and supported by an Implementation Timetable, including Transportation and Delivery Schedule where needed, that is within the duration of the contract as specified in the **Data Sheet** (DS noS. 29 and 30).

Bidders must be fully aware that the goods and related services that UNDP require may be transferred, immediately or eventually, by UNDP to the Government partners, or to an entity nominated by the latter, in accordance with UNDP's policies and procedures. All bidders are therefore required to submit the following in their bids:

- a) A statement of whether any import or export licences are required in respect of the goods to be purchased or services to be rendered, including any restrictions in the country of origin, use or dual use nature of the goods or services, including any disposition to end users;
- b) Confirmation that the Bidder has obtained license of this nature in the past, and have an expectation of obtaining all the necessary licenses, should their bid be rendered the most responsive; and
- c) Complete documentation, information and declaration of any goods classified or may be classified as "Dangerous Goods".

- 15.3 Management Structure and Key Personnel – This section should include the comprehensive

curriculum vitae (CVs) of key personnel that will be assigned to support the implementation of the technical bid, clearly defining their roles and responsibilities. CVs should establish competence and demonstrate qualifications in areas relevant to the requirements of this ITB.

In complying with this section, the Bidder assures and confirms to UNDP that the personnel being nominated are available to fulfil the demands of the Contract during its stated full term. If any of the key personnel later becomes unavailable, except for unavoidable reasons such as death or medical incapacity, among other possibilities, UNDP reserves the right to render the Bid non-responsive. Any deliberate substitution of personnel arising from unavoidable reasons, including delay in the implementation of the project of programme through no fault of the Bidder, shall be made only with UNDP's acceptance of the justification for substitution, and UNDP's approval of the qualification of the replacement who shall be either of equal or superior credentials as the one being replaced.

15.4 Where the **Data Sheet** requires the submission of the Bid Security, the Bid Security shall be included along with the Technical Bid. The Bid Security may be forfeited by UNDP, and reject the Bid, in the event of any or any combination of the following conditions:

- a) If the Bidder withdraws its offer during the period of the Bid Validity specified in the **Data Sheet** (DS no. 11), or;
- b) If the Bid Security amount is found to be less than what is required by UNDP as indicated in the **Data Sheet** (DS no. 9), or;
- c) In the case the successful Bidder fails:
 - i. to sign the Contract after UNDP has awarded it;
 - ii. to comply with UNDP's variation of requirement, as per ITB Clause 35; or
 - iii. to furnish Performance Security, insurances, or other documents that UNDP may require as a condition to rendering effective the contract that may be awarded to the Bidder.

16. Price Schedule

The Price Schedule shall be prepared using the attached standard form (Section 7). It shall list all major cost components associated with the goods and related services, and the detailed breakdown of such costs. All goods and services described in the Technical Bid must be priced separately on a one-to-one correspondence. Any output and activities described in the Technical Bid but not priced in the Price Schedule, shall be assumed to be included in the prices of the items or activities, as well as in the final total price of the bid.

17. Currencies

All prices shall be quoted in the currency indicated in the **Data Sheet** (DS no. 15). However, where Bids are quoted in different currencies, for the purposes of comparison of all Bid:

17.1 UNDP will convert the currency quoted in the Bid into the UNDP preferred currency, in accordance with the prevailing UN operational rate of exchange on the last day of

submission of Bid; and

- 17.2 In the event that the Bid found to be the most responsive to the ITB requirement is quoted in another currency different from the preferred currency as per **Data Sheet** (DS no. 15), then UNDP shall reserve the right to award the contract in the currency of UNDP's preference, using the conversion method specified above.

18. Documents Establishing the Eligibility and Qualifications of the Bidder

- 18.1 The Bidder shall furnish documentary evidence of its status as an eligible and qualified vendor, using the forms provided under Section 5, Bidder Information Forms. In order to award a contract to a Bidder, its qualifications must be documented to UNDP's satisfactions. These include, but are not limited to the following:

- a) That, in the case of a Bidder offering to supply goods under the Contract which the Bidder did not manufacture or otherwise produce, the Bidder has been duly authorized by the goods' manufacturer or producer to supply the goods in the country of final destination;
- b) That the Bidder has the financial, technical, and production capability necessary to perform the Contract; and
- c) That, to the best of the Bidder's knowledge, it is not included in the UN 1267 List or the UN Ineligibility List, nor in any and all of UNDP's list of suspended and removed vendors.

- 18.2 Bids submitted by two (2) or more Bidders shall all be rejected by UNDP if they are found to have any of the following:

- a) they have at least one controlling partner, director or shareholder in common; or
- b) any one of them receive or have received any direct or indirect subsidy from the other/s; or
- c) they have the same legal representative for purposes of this ITB; or
- d) they have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about, or influence on the Bid of, another Bidder regarding this ITB process;
- e) they are subcontractors to each other's bid, or a subcontractor to one bid also submits another Bid under its name as lead Bidder; or
- f) an expert proposed to be in the bid of one Bidder participates in more than one Bid received for this ITB process. This condition does not apply to subcontractors being included in more than one Bid.

19. Joint Venture, Consortium or Association

If the Bidder is a group of legal entities that will form or have formed a joint venture, consortium or association at the time of the submission of the Bid, they shall confirm in their Bid that : (i) they have designated one party to act as a lead entity, duly vested with authority to legally bind the members of the joint venture jointly and severally, and this shall be duly evidenced by a duly notarized Agreement among the legal entities, which shall be submitted along with the Bid; and (ii) if they are awarded the contract, the contract shall be entered into, by and between UNDP and the designated lead entity, who shall be acting for and on behalf of all entities that comprise

the joint venture.

After the bid has been submitted to UNDP, the lead entity identified to represent the joint venture shall not be altered without the prior written consent of UNDP. Furthermore, neither the lead entity nor the member entities of the joint venture can:

- a) Submit another Bid, either in its own capacity; nor
- b) As a lead entity or a member entity for another joint venture submitting another Bid.

The description of the organization of the joint venture/consortium/association must clearly define the expected role of each of the entity in the joint venture in delivering the requirements of the ITB, both in the bid and in the Joint Venture Agreement. All entities that comprise the joint venture shall be subject to the eligibility and qualification assessment by UNDP.

Where a joint venture is presenting its track record and experience in a similar undertaking as those required in the ITB, it should present such information in the following manner:

- a) Those that were undertaken together by the joint venture; and
- b) Those that were undertaken by the individual entities of the joint venture expected to be involved in the performance of the services defined in the ITB.

Previous contracts completed by individual experts working privately but who are permanently or were temporarily associated with any of the member firms cannot be claimed as the experience of the joint venture or those of its members, but should only be claimed by the individual experts themselves in their presentation of their individual credentials.

If the Bid of a joint venture is determined by UNDP as the most responsive Bid that offers the best value for money, UNDP shall award the contract to the joint venture, in the name of its designated lead entity, who shall sign the contract for and on behalf of all the member entities.

20. Alternative Bid

Unless otherwise specified in the **Data Sheet** (DS nos. 5 and 6), alternative bid shall not be considered. Where the conditions for its acceptance are met, or justifications are clearly established, UNDP reserves the right to award a contract based on an alternative bid.

21. Validity Period

21.1 Bid shall remain valid for the period specified in the **Data Sheet** (DS no. 8), commencing on the submission deadline date also indicated in the **Data Sheet** (DS no. 21). A Bid valid for a shorter period shall be immediately rejected by UNDP and rendered non-responsive.

21.2 In exceptional circumstances, prior to the expiration of the Bid validity period, UNDP may request Bidders to extend the period of validity of their Bid. The request and the responses shall be made in writing, and shall be considered integral to the Bid.

22. Bidder's Conference

When appropriate, a Bidder's conference will be conducted at the date, time and location specified in the **Data Sheet** (DS no. 7). All Bidders are encouraged to attend. Non-attendance, however, shall not result in disqualification of an interested Bidder. Minutes of the Bidder's conference will be either posted on the UNDP website, or disseminated to the individual firms who have registered or expressed interest with the contract, whether or not they attended the conference. No verbal statement made during the conference shall modify the terms and conditions of the ITB unless such statement is specifically written in the Minutes of the Conference, or issued/posted as an amendment in the form of a Supplemental Information to the ITB.

D. SUBMISSION AND OPENING OF BID

23. Submission

23.1 The Technical Bid and the Price Schedule must be submitted together and sealed together in one and the same envelope, delivered either personally, by courier, or by electronic method of transmission. If submission will not be done by electronic means, the Technical Bid and Price Schedule must be sealed together in an envelope whose external side must:

- a) Bear the name of the Bidder;
- b) Be addressed to UNDP as specified in the **Data Sheet** (DS no.20); and
- c) Bear a warning not to open before the time and date for Bid opening as specified in the **Data Sheet** (DS no. 24).

If the envelope is not sealed nor labeled as required, the Bidder shall assume the responsibility for the misplacement or premature opening of Bid due to improper sealing and labeling by the Bidder.

23.2 Bidders must submit their Bid in the manner specified in the **Data Sheet** (DS nos. 22 and 23). When the Bid is expected to be in transit for more than 24 hours, the Bidder must ensure that sufficient lead time has been provided in order to comply with UNDP's deadline for submission. UNDP shall indicate for its record that the official date and time of receiving the Bid is the actual date and time when the said Bid has physically arrived at the UNDP premises indicated in the **Data Sheet** (DS no. 20).

23.3 Bidders submitting Bid by mail or by hand shall enclose the original and each copy of the Bid, in separate sealed envelopes, duly marking each of the envelopes as "Original Bid" and the others as "Copy of Bid". The two envelopes, consisting of original and copies, shall then be sealed in an outer envelope. The number of copies required shall be as specified in the **Data Sheet** (DS no. 19). In the event of any discrepancy between the contents of the "Original Bid" and the "Copy of Bid", the contents of the original shall govern. The original version of the Bid shall be signed or initialed by the Bidder or person(s) duly authorized to commit the Bidder on every page. The authorization shall be communicated through a document evidencing such authorization issued by the highest official of the firm, or a Power of Attorney, accompanying the Bid.

- 23.4 Bidders must be aware that the mere act of submission of a Bid, in and of itself, implies that the Bidder accepts the General Contract Terms and Conditions of UNDP as attached hereto as Section 11.

24. Deadline for Submission of Bid and Late Bids

Bid must be received by UNDP at the address and no later than the date and time specified in the **Data Sheet** (DS no. 20 and 21).

UNDP shall not consider any Bid that arrives after the deadline for submission of Bid. Any Bid received by UNDP after the deadline for submission of Bid shall be declared late, rejected, and returned unopened to the Bidder.

25. Withdrawal, Substitution, and Modification of Bid

- 25.1 Bidders are expected to have sole responsibility for taking steps to carefully examine in detail the full consistency of its Bid to the requirements of the ITB, keeping in mind that material deficiencies in providing information requested by UNDP, or lack clarity in the description of goods and related services to be provided, may result in the rejection of the Bid. The Bidder shall assume any responsibility regarding erroneous interpretations or conclusions made by the Bidder in the course of understanding the ITB out of the set of information furnished by UNDP.
- 25.2 A Bidder may withdraw, substitute or modify its Bid after it has been submitted by sending a written notice in accordance with ITB Clause 23, duly signed by an authorized representative, and shall include a copy of the authorization (or a Power of Attorney). The corresponding substitution or modification of the Bid must accompany the respective written notice. All notices must be received by UNDP prior to the deadline for submission and submitted in accordance with ITB Clause 23 (except that withdrawal notices do not require copies). The respective envelopes shall be clearly marked "WITHDRAWAL," "SUBSTITUTION," or "MODIFICATION".
- 25.3 Bid requested to be withdrawn shall be returned unopened to the Bidders.
- 25.4 No Bid may be withdrawn, substituted, or modified in the interval between the deadline for submission of Bid and the expiration of the period of Bid validity specified by the Bidder on the Bid Submission Form or any extension thereof.

26. Bid Opening

UNDP will open the Bid in the presence of an ad-hoc committee formed by UNDP of at least two (2) members. If electronic submission is permitted, any specific electronic Bid opening procedures shall be as specified in the **Data Sheet** (DS no. 23).

The Bidders' names, modifications, withdrawals, the condition of the envelope labels/seals, the number of folders/files and all other such other details as UNDP may consider appropriate, will be announced at the opening. No Bid shall be rejected at the opening stage, except for late

submission, for which the Bid shall be returned unopened to the Bidder.

27. Confidentiality

Information relating to the examination, evaluation, and comparison of Bid, and the recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with such process, even after publication of the contract award.

Any effort by a Bidder to influence UNDP in the examination, evaluation and comparison of the Bid or contract award decisions may, at UNDP's decision, result in the rejection of its Bid.

In the event that a Bidder is unsuccessful, the Bidder may seek a meeting with UNDP for a debriefing. The purpose of the debriefing is discussing the strengths and weaknesses of the Bidder's submission, in order to assist the Bidder in improving the bid presented to UNDP. The content of other bid and how they compare to the Bidder's submission shall not be discussed.

In such case the bidder requires UNDP to sign a Non-Disclosure Agreement (NDA) in order to submit their offer UNDP can do so upon request and if it does not materially affect the tender process.

E. EVALUATION OF BID

28. Preliminary Examination of Bid

UNDP shall examine the Bid to determine whether they are complete with respect to minimum documentary requirements, whether the documents have been properly signed, whether or not the Bidder is in the UN Security Council 1267/1989 Committee's list of terrorists and terrorist financiers, and in UNDP's list of suspended and removed vendors, and whether the Bid are generally in order, among other indicators that may be used at this stage. UNDP may reject any Bid at this stage.

29. Evaluation of Bid

29.1 UNDP shall examine the Bid to confirm that all terms and conditions under the UNDP General Terms and Conditions and Special Conditions have been accepted by the Bidder without any deviation or reservation.

29.2 The evaluation team shall review and evaluate the Bids on the basis of their responsiveness to the Schedule of Requirements and Technical Specifications and other documentation provided, applying the procedure indicated in the **Data Sheet** (DS No. 25). Absolutely no changes may be made by UNDP in the criteria after all Bids have been received.

29.1 UNDP reserves the right to undertake a post-qualification exercise, aimed at determining, to its satisfaction the validity of the information provided by the Bidder. Such post-qualification shall be fully documented and, among those that may be listed in the **Data Sheet** (DS No.33), may include, but need not be limited to, all or any combination of the following:

- a) Verification of accuracy, correctness and authenticity of the information provided by the bidder on the legal, technical and financial documents submitted;
- b) Validation of extent of compliance to the ITB requirements and evaluation criteria based on what has so far been found by the evaluation team;
- c) Inquiry and reference checking with Government entities with jurisdiction on the bidder, or any other entity that may have done business with the bidder;
- d) Inquiry and reference checking with other previous clients on the quality of performance on on-going or previous contracts completed;
- e) Physical inspection of the bidder's plant, factory, branches or other places where business transpires, with or without notice to the bidder;
- f) Testing and sampling of completed goods similar to the requirements of UNDP, where available; and
- g) Other means that UNDP may deem appropriate, at any stage within the selection process, prior to awarding the contract.

30. Clarification of Bid

To assist in the examination, evaluation and comparison of bids, UNDP may, at its discretion, ask any Bidder to clarify its Bid.

UNDP's request for clarification and the Bidder's response shall be in writing. Notwithstanding the written communication, no change in the prices or substance of the Bid shall be sought, offered, or permitted, except to provide clarification, and confirm the correction of any arithmetic errors discovered by UNDP in the evaluation of the Bid, in accordance with ITB Clause 35.

Any unsolicited clarification submitted by a Bidder in respect to its Bid, which is not a response to a request by UNDP, shall not be considered during the review and evaluation of the Bid.

31. Responsiveness of Bid

UNDP's determination of a Bid's responsiveness will be based on the contents of the Bid itself.

A substantially responsive Bid is one that conforms to all the terms, conditions, and specifications of the ITB without material deviation, reservation, or omission.

If a Bid is not substantially responsive, it shall be rejected by UNDP and may not subsequently be made responsive by the Bidder by correction of the material deviation, reservation, or omission.

32. Nonconformities, Repairable Errors and Omissions

32.3 Provided that a Bid is substantially responsive, UNDP may waive any non-conformities or omissions in the Bid that, in the opinion of UNDP, do not constitute a material deviation.

32.4 Provided that a Bid is substantially responsive, UNDP may request the Bidder to submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities or omissions in the Bid related to documentation requirements.

Such omission shall not be related to any aspect of the price of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.

32.5 Provided that the Bid is substantially responsive, UNDP shall correct arithmetical errors as follows:

- a) if there is a discrepancy between the unit price and the line item total that is obtained by multiplying the unit price by the quantity, the unit price shall prevail and the line item total shall be corrected, unless in the opinion of UNDP there is an obvious misplacement of the decimal point in the unit price, in which case the line item total as quoted shall govern and the unit price shall be corrected;
- b) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and
- c) if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to the above.

32.6 If the Bidder does not accept the correction of errors made by UNDP, its Bid shall be rejected.

F. AWARD OF CONTRACT

33. Right to Accept, Reject, or Render Non-Responsive Any or All Bid

- 33.1 UNDP reserves the right to accept or reject any Bid, to render any or all of the Bids as non-responsive, and to reject all Bids at any time prior to award of contract, without incurring any liability, or obligation to inform the affected Bidder(s) of the grounds for UNDP's action. Furthermore, UNDP is not obligated to award the contract to the lowest price offer.
- 33.2 UNDP shall also verify, and immediately reject their respective Bid, if the Bidders are found to appear in the UN's Consolidated List of Individuals and Entities with Association to Terrorist Organizations, in the List of Vendors Suspended or Removed from the UN Secretariat Procurement Division Vendor Roster, the UN Ineligibility List, and other such lists that as may be established or recognized by UNDP policy on Vendor Sanctions. (See http://www.undp.org/content/undp/en/home/operations/procurement/procurement_protest/)

34. Award Criteria

Prior to expiration of the period of Bid validity, UNDP shall award the contract to the qualified and eligible Bidder that is found to be responsive to the requirements of the Schedule of Requirements and Technical Specification, and has offered the lowest price (See DS No. 32).

35. Right to Vary Requirements at the Time of Award

At the time of award of Contract, UNDP reserves the right to vary the quantity of the goods and/or

related services, by up to a maximum twenty-five per cent (25%) of the total offer, without any change in the unit price or other terms and conditions.

36. Contract Signature

Within fifteen (15) days from the date of receipt of the Contract, the successful Bidder shall sign and date the Contract and return it to UNDP.

Failure of the successful Bidder to comply with the requirement of ITB Section F.3 and this provision shall constitute sufficient grounds for the annulment of the award, and forfeiture of the Bid Security if any, and on which event, UNDP may award the Contract to the Bidder with the second highest rated Bid, or call for new Bid.

37. Performance Security

A performance security, if required, shall be provided in the amount and form provided in Section 9 and by the deadline indicated in the **Data Sheet** (DS no. 14), as applicable. Where a Performance Security will be required, the submission of the said document, and the confirmation of its acceptance by UNDP, shall be a condition for the effectivity of the Contract that will be signed by and between the successful Bidder and UNDP.

38. Bank Guarantee for Advanced Payment

Except when the interests of UNDP so require, it is the UNDP's preference to make no advanced payment(s) on contracts (i.e., payments without having received any outputs). In the event that the Bidder requires an advanced payment upon contract signature, and if such request is duly accepted by UNDP, and the said advanced payment exceeds 20% of the total Bid price, or exceeds the amount of USD 30,000, UNDP shall require the Bidder to submit a Bank Guarantee in the same amount as the advanced payment. A bank guarantee for advanced payment shall be furnished in the form provided in Section 10.

39. Vendor Protest

UNDP's vendor protest procedure provides an opportunity for appeal to those persons or firms not awarded a purchase order or contract through a competitive procurement process. In the event that a Bidder believes that it was not treated fairly, the following link provides further details regarding UNDP vendor protest procedures:
<http://www.undp.org/procurement/protest.shtml>

Instructions to Bidders

DATA SHEET

The following data for the supply of goods and related services shall complement / supplement the provisions in the Instruction to Bidders. In the case of a conflict between the Instruction to Bidders and the Data Sheet, the provisions in the Data Sheet shall prevail.

DS No.	Cross Ref. to Instructions	Data	Specific Instructions / Requirements
1		Project Title:	GP 600409-1 Long Term Agreement for Lithium Ion based Energy Storage Systems and PV Lighting Kits
2		Title of Goods/Services/Work Required:	Lithium Ion Energy Storage Systems and PV Lighting Kits
3		Country:	Global, deliveries worldwide
4	C.13	Language of the Bid:	<input checked="" type="checkbox"/> English
5	C.20	Conditions for Submitting Bid for Parts or sub-parts of the Total Requirements	<input checked="" type="checkbox"/> Partial Bidding (and partial lots) accepted
6	C.20	Conditions for Submitting Alternative Bid	<input checked="" type="checkbox"/> Shall not be considered.
7	C.22	A pre-Bid conference will be held on:	Not applicable
8	C.21.1	Period of Bid Validity commencing on the submission date	<input checked="" type="checkbox"/> 120 days
9	B.9.5 C.15.4 b)	Bid Security	<input checked="" type="checkbox"/> Not Required

15	C.17 C.17.2	Preferred Currency of Bid and Method for Currency conversion	<input checked="" type="checkbox"/> United States Dollars (US\$)
16	B.10.1	Deadline for submitting requests for clarifications/questions	7 working days before the submission date.
17	B.10.1	Contact Details for submitting clarifications/questions ¹	Focal Person in UNDP: Mettelena Herring and GPU CREE E-mail address dedicated for this purpose: mettelena.herring@undp.org gpucrec@undp.org
18	B.11.1	Manner of Disseminating Supplemental Information to the ITB and responses/clarifications to queries	<input checked="" type="checkbox"/> Direct communication to prospective Bidders by email and Posting on the websites ² procurement-notices.undp.org and ungm.org
19	D.23.3	No. of copies of Bid that must be submitted	Proposals must be submitted in soft copy only . Submissions must be identical and include all required documents.
20	D.23.1 b) D.23.2 D.24	Bid submission address	Pso.bidtender@undp.org
21	C.21.1 D.24	Deadline of Bid Submission	Date and Time: <u>1 May 2017, 17.00 Hours Copenhagen local time.</u>
22	D.23.2	Manner of Submitting Bid	<input checked="" type="checkbox"/> Electronic submission of Bid
23	D.23.2 D.26	Conditions and Procedures for electronic submission and opening, if allowed	<input checked="" type="checkbox"/> Official Address for e-submission: psobidtender@undp.org <input checked="" type="checkbox"/> Format: PDF files are preferred <input checked="" type="checkbox"/> Max. File Size per transmission: 5MB <input checked="" type="checkbox"/> No. of copies to be transmitted: 1 <input checked="" type="checkbox"/> Mandatory subject of email: GP600409-1 – ITB for LTA Lithium Ion ESS and PV Lighting Kits

¹ This contact person and address is officially designated by UNDP. If inquiries are sent to other person/s or address/es, even if they are UNDP staff, UNDP shall have no obligation to respond nor can UNDP confirm that the query was officially received.

² Posting on the website shall be supplemented by directly transmitting the communication to the prospective offerors.

24	D.23.1 c)	Date, time and venue for opening of Bid	<p><u>Date and Time: 3 May 2017 10:00 hours Copenhagen local time.</u></p> <p>Venue: United Nations Development Programme (UNDP), Att. Procurement Support Office Bid / Tender Unit Marmorvej 51, 4th floor 2100 Copenhagen Ø, Denmark</p> <p>Any bidder that intends to participate in the public bid opening shall notify Arvis Vilcins (arvis.vilcins@undp.org) at least 24 hours in advance – please note that if notification is not given, access will not be granted.</p>
25		Evaluation method to be used in selecting the most responsive Bid	<input checked="" type="checkbox"/> Non-Discretionary “Pass/Fail” Criteria on the Technical Requirements; and <input checked="" type="checkbox"/> Lowest priced offer(s) of technically qualified/responsive Bid(s)
26	C.15.1	Required Documents that must be Submitted to Establish Qualification of Bidders (In “Certified True Copy” form only)	<input checked="" type="checkbox"/> Company Profile, which should <u>not</u> exceed fifteen (15) pages, including printed brochures and product catalogues relevant to the goods/services being procured <input checked="" type="checkbox"/> Tax Registration/Payment Certificate issued by the Internal Revenue Authority evidencing that the Bidder is updated with its tax payment obligations, or Certificate of Tax exemption, if any such privilege is enjoyed by the Bidder <input checked="" type="checkbox"/> Certificate of Registration of the business, including Articles of Incorporation, or equivalent document if Bidder is not a corporation <input checked="" type="checkbox"/> Trade name registration papers, if applicable <input checked="" type="checkbox"/> Official Letter of Appointment as local representative, if Bidder is submitting a Bid in behalf of an entity located outside the country <input checked="" type="checkbox"/> Quality Certificate (e.g., ISO, etc.) and/or other similar certificates, accreditations, awards and citations received by the Bidder, if any <input checked="" type="checkbox"/> Quality Certificates for the proposed items per LOT conforming to the standards indicted in Section 3. <input checked="" type="checkbox"/> Environmental Compliance Certificates, Accreditations, Markings/Labels, and other

			<p>evidences of the Bidder's practices which contributes to the ecological sustainability and reduction of adverse environmental impact (e.g., use of non-toxic substances, recycled raw materials, energy-efficient equipment, reduced carbon emission, etc.), either in its business practices or in the goods it manufactures</p> <p><input checked="" type="checkbox"/> Certification or authorization to act as Agent in behalf of the Manufacturer, or Power of Attorney, if bidder is not a manufacturer</p> <p><input checked="" type="checkbox"/> Audited Financial Statement (Income Statement and Balance Sheet) including Auditor's Report for the past 3 years.</p> <p>Financial soundness:</p> <p>a) The total average Annual Turnover over each of the last two years exceeded the amount of U\$ 500,000.</p> <p>b) Quick Ratio (current assets / current liabilities) > 1.0.</p> <p><input checked="" type="checkbox"/> Previous Experience: Documentary evidence of a minimum of 3 purchase orders / contracts awarded and served <u>within</u> the past 3 years proving relevant international experience in supplying the items/services offered in response to this ITB.</p> <p><input checked="" type="checkbox"/> At least 3 Reference letters from previous projects during the last 5 years certifying the correct operation of the ESS supplied by the bidder.</p> <p><input checked="" type="checkbox"/> All information regarding any past and current litigation during the last five (5) years, in which the bidder is involved, indicating the parties concerned, the subject of the litigation, the amounts involved, and the final resolution if already concluded.</p> <p><input checked="" type="checkbox"/> Data sheets, Catalogues and certificates of conformity for the main components of the ESS as outlined in Section 3</p> <p><input checked="" type="checkbox"/> Proof of after-sales service capacity and appropriateness of in-house or local/regional service and technical support available (when local or regional, please indicate the location)³.</p> <p><input checked="" type="checkbox"/> Proof in the form of signed documentation that the batteries offered in bidder's proposal meet the required number of cycles under assumed conditions as stipulated in the TORs: section 3.a.4</p>
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³ Please see list of Regions/ Countries UNDP operates in, in table on page 25 (Datasheet Table 1)

			<input checked="" type="checkbox"/> The CVs of the in-house or local/regional Key Staff (specialized commissioning and/or installation engineers) <input checked="" type="checkbox"/> List of countries where the Bidder can supply, install, commission, train, and provide after-sales services either through in-house technical expertise or local/regional partner ⁴
27		Other documents that may be Submitted to Establish Eligibility	<input checked="" type="checkbox"/> Confirmation of non-inclusion of the bidder in the in UN's Consolidated List of Individuals and Entities with Association to Terrorist Organizations, in the List of Vendors Suspended or Removed from the UN Secretariat Procurement Division Vendor Roster, the UN Ineligibility List and in the list of vendors sanctioned by UNDP (refer to section 5, point 14)
28	C.15	Structure of the Technical Bid and List of Documents to be Submitted	Bidders are requested to structure and submit the bids as per below: Section 3 – Schedule of Requirements and Technical Specifications Section 4 – Bid Submission Form Section 5 – Documents Establishing the Eligibility and Qualifications of the Bidder Section 6 – Technical Bid Form Section 7 – Price Schedule Form
29	C.15.2	Latest Expected date for commencement of Contract	<i>June 30, 2017</i>
30	C.15.2	Maximum Expected duration of contract	Two years + one additional year subject to performance
31		UNDP will award the contract to:	<input checked="" type="checkbox"/> One or more Bidders, depending on the following factors: - Product technical compliance & product price

32	F.34	Criteria for the Award and Evaluation of Bid	<p><u>Award Criteria</u></p> <p><input checked="" type="checkbox"/> Non-discretionary “Pass” or “Fail” rating on the detailed contents of the Schedule of Requirements and Technical Specifications</p> <p><input checked="" type="checkbox"/> Compliance on the following qualification requirements:</p> <p><u>Bid Evaluation Criteria</u>⁵</p> <p><input checked="" type="checkbox"/> Demonstrated ability to honour important responsibilities and liabilities allocated to Bidder in this ITB (e.g. financial, performance guarantees, warranties, or insurance coverage, etc).</p> <p><input checked="" type="checkbox"/> Similar Projects reference list (at least 5 projects) shows experience and also the availability of equipment of the same basic design and similar size to operate correctly in the indicated environmental and climatic conditions successfully for at least 2 years and has ISO 9001 quality management certificates.</p> <p><input checked="" type="checkbox"/> Proof of after-sales service capacity and appropriateness of in-house or local/regional service and technical support available (when local or regional, please indicate the location)⁶.</p> <p><input checked="" type="checkbox"/> Full compliance of Bid to the Technical Requirements.</p> <p><input checked="" type="checkbox"/> The CVs of the Key Staff in-house or local/regional (specialized commissioning and/or installation engineers may be required) who have the qualifications and experience in the installation of the ESS integrated into PV power plants (when local or regional, please indicate the location)⁹.</p> <p><input checked="" type="checkbox"/> Data sheets, Catalogues and certificates of conformity for the main components of the ESS (LIB, BMC, inverters, etc) meet or exceed the requirements of this ITB and relevant international performance standards.</p> <p><input checked="" type="checkbox"/> List of countries where the Bidder can supply, install, commission, train, and provide after-sales services either through in-house technical expertise or local/regional partner⁷</p> <p><input checked="" type="checkbox"/> Lowest Operating Costs Evidenced by a Table of Consumables, Rate of Consumption, and Unit Price;</p>
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⁶ Please see list of Regions/ Countries UNDP operates in, in table on page 25 (Datasheet Table 1)

⁷ Please see list of Regions/ Countries UNDP operates in, in table on page 25 (Datasheet Table 1)

			<input checked="" type="checkbox"/> Warranty on parts and services for a minimum period of 2 years for Lot 1 and 5 years for Lot 2 and 3. <input checked="" type="checkbox"/> Appropriateness of the Implementation Timetable to Project Schedule.
33	E.29	Post Qualification Actions	<input checked="" type="checkbox"/> Verification of accuracy, correctness and authenticity of the information provided by the bidder on the legal, technical and financial documents submitted; <input checked="" type="checkbox"/> Validation of extent of compliance to the ITB requirements and evaluation criteria based on what has so far been found by the evaluation team; <input checked="" type="checkbox"/> Inquiry and reference checking with other previous clients on the quality of performance on ongoing or previous contracts completed; <input checked="" type="checkbox"/> Physical inspection of the bidder's plant, factory, branches or other places where business transpires, with or without notice to the bidder.

Datasheet Table 1: UNDP operates in the following Regions and Countries:

<i>Region</i>	<i>Country</i>
Africa	Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, CAR, Chad, Comoros, Congo (DRC), Rep of Congo, Cote D'Ivoire, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome, Senegal, Seychelles, Sierra Leone, South Africa, South Sudan, Swaziland, Togo, Uganda, Tanzania, Zambia, Zimbabwe
Arab States	Algeria, Bahrain, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Morocco, Programme of Assistance to the Palestinian People, Yemen, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, UAE
Asia and Pacific	Afghanistan, Bangladesh, Bhutan, Cambodia, China, Cook Islands, Dem Rep Korea, Fiji, India, Indonesia, Iran, Kiribati, Lao PDR, Malaysia, Maldives, Marshall Islands, Micronesia, Mongolia, Myanmar, Nauru, Nepal, Niue, Pakistan, PNG, Philippines, Samoa, Sri Lanka, Thailand, Timor-Leste, Viet Nam
Europe and CIS	Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Croatia, Cyprus, Georgia, Kazakhstan, Kosovo, Kyrgyzstan, Moldova, Montenegro, Romania, Russian Federation, Serbia Tajikistan, The former Yugoslav Republic of Macedonia, Turkey, Turkmenistan, Ukraine, Uzbekistan
Latin America and Caribbean	Argentina, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, Uruguay, Venezuela

Section 3: Schedule of Requirements and Technical Specifications

3.a. Background Information, Objective and Scope

3.a.1. Background:

Over the past ten years there has been a rapid increase in both the scale and the number of PV power plants worldwide. This increase has been driven by a combination of rising conventional electricity costs, technology advancement, environmental concern and strong government incentives to encourage investment in grid-connected applications that resulted in significant lower costs of PV modules. Grid connected applications represent roughly 80% of the present global market, while the 20% of applications are mainly considered off-grid. The combination of high costs of expanding the public electrical grid to increase the access to rural and low energy density areas and the lower prices for PV generation have resulted in high interest in autonomous electrification schemes. Off-grid PV micro power plants and PV back-up micro power plants are often the least cost options. This is particularly the case in remote sites and in developing countries where the public grid infrastructure is limited or the service is unreliable.

Because of the intermittency of solar generation in these plants, electricity storage is needed to deliver an uninterrupted service to the loads. Additionally, when the DC voltage of the storage is not the same of that of the loads, a converter is needed to adapt it to the required conditions. In this specification, the term Energy Storage Solution (ESS) is used to include a battery, the Battery Management System (BMS), the converter if needed and protections. The selection of the type of storage, sizing its capacity and engineering the ESS to the specific requirements of the demand profile are key to long term performance of autonomous and hybrid PV plants.

UNDP operates in over 170 countries globally including additional remote missions in support of national projects. UNDP premises are usually reliant of main power supply from the national energy supplier (grid) but the organization also has off-grid locations where it is dependent on generators for power supply. Electricity from the main grid usually comes from fossil fuel powered stations (thermal power stations) with little or no alternative power supply mix. The quality and reliability of the main utility power is in some cases low, which impact operations.

During the last 3 – 5 years, UNDP has been commissioning photovoltaic (PV) off-grid stations or PV-hybrid (hybridized with the main grid or diesel generators) plants in many locations and aims at expanding PV installation globally at a fast rate.

3.a.2 Objective:

UNDP therefore aims to establish long-term agreements (LTAs) with different Energy Storage Systems (ESS) suppliers for the supply (and in some cases also training, installation, commissioning and after-sales) of lithium-ion batteries (LIBs) and components for PV plants to be installed globally. UNDP also envisages the possibility refurbish operating plants and replace storage components that which have reached their End of Life.

Once the LTAs are established, a secondary bidding process (secondary competition) for a specific project, between all qualified LTA suppliers will be conducted in order to identify the lowest priced technically compliant offer (see 3.a.5 below).

The ITB has been divided into 3 Lots. Bidders may submit proposals for one or more lots, or one or more sub-lots. **Therefore, partial bids and partial lots are accepted.**

3.a.3. Scope:

The ITB will be focused on requesting the full ESS consisting of **Lithium-Ion Battery (LIB) Systems including the battery management systems (BMS) and a compatible inverter** to avoid problems in the compatibility between the electronics in the BMS and the electronics in the inverter.

For actual orders following establishment of the LTAs, installation, commissioning, handing-over in good operating conditions and after-sales services will be required. The services will be requested and evaluated during the secondary bidding process.

Lots

There are many end-uses for PV technology, with a broad catalogue of design size and complexity. Depending on the application, more sophisticated control may be required and compatibility of ESS with the full PV plant may be a critical factor. Therefore, the ITB is distributed into 3 different lots depending on the application.

Another differentiating factor and requirement is the capacity (i.e. size) of the ESS. Therefore, the Lots are distributed into Sub Lots depending on the *capacity requirements*.

A. Lot 1 - PV lighting kits:

The PV lighting kits offered shall be a set of components matched and tested as a package by a manufacturer that consist at least of a photovoltaic module/s, LIB, BMS, wiring and switches and lighting equipment that can autonomously supply several illumination points for a given number of hours per day. The supply voltage to the loads shall be DC.

B. Lot 2 - Autonomous AC plants:

Supply of ESS to be integrated in autonomous AC PV plants to ensure the electricity supply consisting of LIBs, BMS, autonomous inverters and protections for the selected sites and, based on the project requirements, the provision of services such as (but not limited to) installation, commissioning, training as well as documentation on the operation and maintenance of the supplied solution. The supply voltage to the loads shall be AC.

Four categories/sub Lots will be considered within this Lot:

- Sub Lot 2.1 ESS PV-1: From 1 up to 25 kWh
- Sub Lot 2.2 ESS PV-2: From 25 to 200kWh
- Sub Lot 2.3 ESS PV-3: From 200 to 500 kWh
- Sub Lot 2.4 ESS PV-4: From 500 kWh to 1MWh

C. Lot 3 - For multiple source (MS) PV plants:

Supply of ESS to be integrated in PV hybrid plants where PV is used in combination with one or more auxiliary sources of power. The ESS shall consist of LIBs, BMS, dual-mode inverters and protections for

selected sites and, based on the project requirements, the provision of services such as (but not limited to) installation, commissioning, training as well as documentation on the operation and maintenance of the installed solution. Four categories/Sub Lots will be considered within this Lot:

- Sub Lot 3.1 ESS MS-1: From 1 up to 25 kWh
- Sub Lot 3.2 ESS MS-2: From 25 to 200kWh
- Sub Lot 3.3 ESS MS-3: From 200 to 500 kWh
- Sub Lot 3.4 ESS MS-4: From 500 kWh to 1MWh

3.a.4. Award criteria / selection criteria

For the purpose of this ITB, the criteria will be based on the selection of the lowest priced technically qualified Bidder:

For Lot 1: lowest priced technically qualified

For Lot 2 and Lot 3: lowest priced technically qualified where the price (USD/kWh) will be calculated based on:

- Acquisition and Warranty Price (AWP) (in USD): EXW price of the battery system (USD) including warranty extension (if required to reach the 5 years' performance warranty):
 - AWP (USD) = EXW price + warranty extension
 - ENERGY THROUGHPUT (ETP) (in kWh): Energy throughput during life ownership, which is equivalent to the practical capacity (PC) x usable cycles in 10 years in the following conditions:
 - Lot 2: Practical capacity x 1,500 full cycles in 10 years (assuming that the battery will work at temperature 25°C, daily cycles of 40% DoD in 12 hours):
 - ETP (kWh) = PC x 1,500 cycles x 10 years
 - Lot 3: Practical capacity x 10,000 full cycles in 10 years (assuming that the battery will work at temperature 25°C, 3 daily cycles of 90% DoD in 4 hours):
 - ETP (kWh) = PC x 10,000 cycles x 10 years

Final price to be included in the price schedule: AWP/ETP (USD/kWh)

Categories/Sub Lots per lot 2:

- Sub Lot 2.1 ESS PV-1: From 1 up to 25 kWh
- Sub Lot 2.2 ESS PV-2: From 25 to 200kWh
- Sub Lot 2.3 ESS PV-3: From 200 to 500 kWh
- Sub Lot 2.4 ESS PV-4: From 500 kWh to 1MWh

Categories/Sub Lots per lot 3:

- Sub Lot 3.1 ESS MS-1: From 1 up to 25 kWh
- Sub Lot 3.2 ESS MS-2: From 25 to 200kWh
- Sub Lot 3.3 ESS MS-3: From 200 to 500 kWh
- Sub Lot 3.4 ESS MS-4: From 500 kWh to 1MWh

3.a.5. Secondary competition will be applied for all call-offs:

LTA's will be subject to call-off at any point during the validity period through case-by-case secondary competition.

The above selection of lowest priced technically qualified bidder (3.a.4) will also apply to secondary bidding processes. However, investment costs will include further components such as freight, required services, etc. i.e. DAP pricing will be considered.

As UNDP has requests for ESS the organisation will solicit the LTA holders for specific offerings in a secondary round of competition on details such as certain technical features, system design, installation, maintenance & performance warranty agreements.

3.a.6. Terms of Execution:

Replacement and Spare Parts: All components that maybe replaced during the life time of the product need to have spare parts available. Equivalent parts replacing the installed item can be proposed with the UNDP/beneficiary/client approval.

Warranties:

The supplied goods shall be tested, commissioned and handed over complete and in perfect operating condition and shall be covered under a defects liability (parts and labour) for a minimum period of 24 months from the date of commissioning. This warranty covers all manufacturer / workmanship defects only.

- The expected duration of PV lighting kits (Lot 1) should be more than 5 years of normal use.
- The expected duration of the ESS in Lot 2 and Lot 3 should be more than 10 years of normal use.

The main components shall also have a manufacturer's warranty of defects in materials and workmanship for a minimum period as specified below:

- **For Lot 1:**
 - The expected duration of PV lighting kits should be more than 5 years of normal use and the warranty period should be of at least 2 years
 - LED lamps: the expected duration of the lamps should be more than 20,000 hours and L95 of at least 2,000 hours (i.e. the lamps should provide 2,000 hours of the expected illumination before the illumination drops below 95% of the rated value).
 - PV Modules: Overall 10 years of power output warranty and 2 years on material and manufacturing faults.
- **For Lot 2 and 3:**
 - The expected duration of the ESS should be more than 10 years of normal use and the warranty period (for the complete solution and/or for the different elements integrated in the ESS) should be of at least 5 years (included extensions if required)

- The Contractor has a maximum of one month to replace any defective component.
- It is understood that any alteration made to the product without the prior written approval of the Contractor will automatically cancel the remaining warranty period on the affected part.

3.a.7. General requirements

Scope

The works shall consist of supplying the complete ESS (consisting of the LIB, BMS and a compatible inverter) detailed in this ITB.

The project consists of the supply of the following equipment for Lot 1:

- PV lighting kit and operating guidelines
- Operation and Maintenance Manual

The project consists of the supply of the following equipment for Lot 2 and Lot 3:

- ESS per site specifications
- Testing and Handing Over in good operation conditions (if the case may be)
- Training Manual and Training sessions to the beneficiaries' staff maintenance crews (if the case may be)
- Operation and Maintenance Manual

The Supplier shall provide all necessary components except otherwise specified, and accessories, at the Supplier's own expense so that UNDP will be able to install complete operational units at the final sites.

The equipment furnished to these specifications must meet or exceed all requirements herein. Modifications of or additions to basic standard equipment of less size or capability to meet these requirements will not be acceptable.

The technical specifications presented herein are not to be interpreted as necessarily defining a particular manufacturer's product, model or features. The equipment shall conform in capability, strength, quality and workmanship to the accepted industry standards and relevant international quality standards.

Environmental and climatic conditions

All equipment shall be fully operational in the following conditions:

- Relative humidity up to 95%
- Ambient temperature from -5°C to 45°C
- Rural environment with high presence of dust, insects, etc.

External equipment shall additionally withstand the following conditions⁸:

⁸ Safety against marine corrosion may be required for some requests during secondary bidding processes.

- High ultra violet radiation
- Wind speeds up to 120 km/h

Section 3b – Technical Specifications for Lots 1 – 3

Please note that the technical specifications outlined in this document should be considered the minimum threshold for passing technical evaluation and will be considered as minimum technical specifications for the subsequent LTAs.

Glossary of Terms:

Components	
Photovoltaic module or panel	The smallest complete environmentally protected assembly of interconnected cells. Colloquially referred to as a "solar module".
DC converter	An electronic component that changes the generator output voltage into a useable d.c. voltage.
Battery Management System	DC converter that also controls the state of charge of the battery, temperature and other safety conditions
Maximum power point tracking	A control strategy for dc converters whereby the PV generator operation is always near the point of current-voltage characteristic where the product of current and voltage yields the maximum electrical power under the operating conditions. Abbreviation: MPPT.
Inverter	A system component that converts d.c. electricity into a.c. electricity. One of the family of components that is included in "power conditioner".
Grid-connected inverter	An inverter that is able to operate in grid-parallel with a utility supply authority.
Grid-dependent inverter	An inverter that can only to operate in grid-parallel with an AC electric grid. Also known as a grid-tied inverter.
Dual mode inverter	A type of inverter that is able to operate in both autonomous and grid-parallel modes according to the availability of the utility supply authority. This type of inverter initiates autonomous operation.
Autonomous inverter	An inverter that supplies a load not connected to an electric utility. Also, known as a "battery-powered inverter" or "stand-alone inverter"
Storage	Accumulation of electricity in a non-electric form and which can be reconverted to electricity.
Lead-acid battery	An electrochemical electricity storage device commonly used in UPS and autonomous PV plants.
Lithium-ion Battery	An electrochemical electricity storage device which has a positive electrode made of lithiated metal oxides. Referred as LIB.
Energy Storage Solution	A set of component that store electrical energy to supply loads and consists of battery, BMS, and inverter (converter) for the proper operation of the loads (ESS)
Energy and Management System	Component with the objective of ensuring the proper management of the power plant (EMS)
Genset	A colloquial term meaning "engine-generator set" consisting of an engine coupled to a rotating electric generator. Also referred to as thermal generator.
Individual electrification plant	A small electric generating system that supplies electricity to one consumption point usually from a single energy source.
Interconnection	the result of the process of electrically connecting a distributed generation plant to a distribution system in order to enable the two systems to operate in parallel with each other.
Autonomous operation	The operating mode in which loads are electrified solely by the PV plant and not in parallel with the utility. Also known as stand-alone or off-grid.
Grid-connected operation	The operating mode in which a PV plant is operating in parallel with an electric grid. Site loads will be electrified by either or both the utility or the plant. Electricity will be able to flow into the grid if the utility permits back feed operation.
Photovoltaic plant	A photovoltaic generator and other components that generate and supply electricity suitable for the intended application. The component list and system configuration varies according to the application, and could also include: power conditioning, storage, system monitoring and control and utility grid interface. Also known as a photovoltaic system. Some such plants are grid-connected and large and others can also be small (micro plants). The following terms describe common system configurations.
Hybrid photovoltaic plant	See multi-source photovoltaic plant.
Multi-source photovoltaic plant	A power plants with photovoltaic generation operating in parallel with other electricity generators. Also called a "hybrid" system.

Site	The geographical location of a plant and the load is supplied.
Sub-system	An assembly of components. The following terms describe common subsystems.
<i>Photovoltaic generator sub-system</i>	The components that convert light energy into electricity using the photovoltaic effect.
<i>Power conditioning sub-system</i>	The component(s) that convert(s) electricity from one form into another form that is suitable for the intended application. Such a sub-system could include the charge controller that converts d.c. to d.c., the inverter that converts d.c. to a.c., or the charger or rectifier that converts a.c. to d.c..
<i>Storage sub-system</i>	The component(s) that store(s) energy.
<i>Monitor and control sub-system</i>	The logic and control component(s) that supervise(s) the overall operation of the plant by controlling the interaction between all sub-systems.
<i>Safety disconnect sub-system</i>	The component(s) that monitor(s) utility grid conditions and open(s) a safety disconnects for out-of-bound conditions.
<i>Data logging and evaluation sub-system</i>	The measurement and logic component(s) that register and process all relevant operational parameters and data of the plant to establish the daily, monthly and annual final yields, losses and performance of the subsystems.
Performance parameters	
Standard test conditions (STC)	Reference values of in-plane irradiance ($G_{l,ref} = 1\,000\text{ W.m}^{-2}$), air temperature (25°C), and air mass ($AM = 1,5$) to be used during the testing of any photovoltaic device. Abbreviation: STC.
Load	An electrical component that converts electricity into a form of useful energy and only operates when voltage is applied.
Performance ratio	The overall effect of losses on an array's rated output due to array temperature, incomplete utilization of the irradiation, and system component inefficiencies or failures. Commonly found by the quotient of the final system yield over the reference yield. Symbol: PR
Losses	The electrical power or energy that does not result in the service that is intended for the electricity.
Normalized losses	The amount of time that a device or system would need to operate at its rated capacity in order to provide for system energy losses. These are commonly calculated from a difference in yields.
Plant rated power	Pertaining to PV autonomous and back-up plants: The rated power capacity to supply a load.
Efficiency	The ratio of output quantity over input quantity. The quantity specified is normally the power, energy, or electric charge produced by and delivered to a component. Symbol: η is commonly used. Units: dimensionless, usually expressed as a percentage (%).
Rated efficiency	Pertaining to a device: The efficiency of a device at specified operating conditions, usually standard test conditions (STC). Pertaining to an inverter: The efficiency of an inverter when it is operating at its rated output.
Power efficiency	The ratio of active output power to active input power.
Partial load efficiency	The ratio of the effective inverter output power to its input power at a specified load.
Weighted average conversion efficiency	A method of estimating the effective energy efficiency. It is calculated as the sum of products of each power level efficiency and related weighting coefficients depend on a regional irradiance duration curve. When the plant is an autonomous type with a storage subsystem, the weighting coefficients depend on the load duration curve.
Storage rated capacity	The energy (or charge) that can be withdrawn from the storage device under specified discharge rate (time) and temperature conditions.
Practical capacity (or useful capacity)	The fraction of the rated capacity that can be extracted from a full charge condition without exceeding the threshold recommended by the manufacturer. For the same required practical capacity, a battery with a lower allowed SoC will require a smaller rated capacity.
Residual capacity	The charge or energy capacity remaining in an electrical storage device following a partial discharge.
State of charge	The ratio between the residual capacity and the rated capacity of a storage device. Abbreviation: SOC. Units: dimensionless, usually expressed as a percentage (%).
Partial state of charge	A state indicating that an electrical storage device has not reached a full charge. Abbreviation: PSOC. Units: dimensionless, usually expressed as a percentage (%).
Depth of discharge	A value to express the discharge of an electrical storage device. The ratio of the discharge amount to the rated capacity is generally used. Abbreviation: DOD. Units: dimensionless, usually expressed as a percentage (%).
Charging efficiency	A generic term to express ampere-hour efficiency (or less commonly, watt-hour efficiency).
Ampere-hour efficiency	The ratio of the amount of electrical charge removed during discharge conditions to the amount of electrical charge added during charge conditions in an electrical storage device.
Watt-hour efficiency	The ratio of the amount of electrical energy removed during discharge conditions to the amount of electrical energy added during charge conditions in an electrical storage device.

Storage Service/Calendar lifetime	The operational calendar time of a battery under given operating conditions and temperature.
Storage Cycle lifetime	Total number of discharge and recharge cycles that a battery is expected to withstand
Inverter rated power	The power that can be supplied by the inverter at 25 °C. In grid-connected mode it refers to a continuous operating condition, in autonomous mode it usually refers to a 30' surge.
Inverter efficiency	The ratio of the useful inverter output to its input.
Environmental parameters	
Ambient temperature	The temperature of the air surrounding a PV generator as measured in a vented enclosure and shielded from solar. Symbol: T _{amb} . Unit: °C.
Tilt angle	The angle between the horizontal plane and the plane of the module surface.
Irradiance	Electromagnetic radiated power incident upon a surface, most commonly from the sun or a solar simulator. Symbol: G. Unit: W·m ⁻² .
Global irradiance	Irradiance on a horizontal surface. This equals horizontal direct irradiance plus horizontal diffuse irradiance.
In-plane irradiance	Total irradiance on the plane of a device. Symbol: G _i .
Solar energy	Common term meaning irradiation.
Irradiation	Irradiance integrated over a specified time interval. Symbol: H. Unit: J·m ⁻² .]
Testing and certification	
Inspection	Evaluation for conformity by measuring, observing, testing, or gauging the relevant characteristics as required by the technical specifications.
Tests	Technical operations to establish one or more characteristics of a given product or service according to a specified procedure.
Acceptance testing	Site-specific testing to assure acceptable performance as required by the technical specifications.
Verification	Confirmation by examination and recording of physical evidence that specified requirements have been met.
Verification testing	Site-specific, periodic testing to assure continued acceptable performance.
Certificate of conformity	A label, nameplate, or document of specified form and content, directly associated with a product or service on delivery to the purchaser, attesting that the product or service is in conformity with the requirements of the certification program (e.g., with the referenced standards and specifications).
Miscellaneous	
Total harmonic distortion	The ratio of effective signal of total harmonic to effective signal of basic frequency. Units: dimensionless, usually expressed as a percentage (%).
Safe extra low voltage (SELV)	An extra-low voltage system which is electrically separated from earth and from other systems in such a way that a single fault cannot give rise to the risk of electric shock.
Extra-low voltage (ELV)	Voltage not exceeding not exceeding 50 V a.c. and 120 V ripple free d.c (a ripple content not exceeding 10% r.m.s). Some national standards consider 75 V dc as a maximum. In consideration of ELV status, VOC of the PV generator must be used
Low voltage (LV)	Voltage exceeding extra-low voltage, but not exceeding 1 000 V a.c. or 1 500 V d.c.
High voltage (HV)	Voltage exceeding low voltage.
Class II equipment	Equipment in which protection against electric shock does not rely on basic insulation only, but in which additional safety precautions such as double insulation or reinforced insulation are provided, there being no provision for protective earthing or reliance upon installation conditions
Class III equipment	Equipment in which protection against electric shock relies on supply at SELV and in which voltages higher than those of SELV are not generated.
Double insulation	Insulation comprising both basic insulation and supplementary insulation.
Earthing	A protection against electric shocks.

3.b.1. LOT 1

3.b.1.1. Technical requirements

Functional configuration:

The loads offered to the selected sites requiring the autonomous fixed PV lighting kits will have the main consumption spread along the evening and night (lighting). This means that under typical average conditions the coincidence factor between the load profile and the PV generation is very low (< 10%).

A compact rugged solution is sought with very long service life and low maintenance. The kit has to operate at a rated service voltage of 12 V_{DC} for the lamps and at 5 V for the USB outlet.

The requirements of the specifications in this document are derived from the final lighting output requirements. Illumination has to be provided to 3 separate rooms from a PV lighting kit that includes the cabling and switches for the lights. Typically, operation will be at night time. Each room requires at least 700 lumens and this can be accomplished with one lamp or, optionally, 2 smaller lamp units. An additional courtesy lamp yielding at least 150 lumens with an independent cable and switch is required that will be used in any of the rooms. The total illumination requirement is therefore a minimum magnitude of lumens during certain number of hours per day. The energy output of the USB outlet is not part of this average condition energy requirement because it will be used only on favourable conditions. The battery shall have autonomy for at least 1.5 average illumination daily requirements.

The capacity of the PV generator and the rated capacity of the battery should be calculated and defined by the manufacturer to provide the required illumination service. It will be influenced by the energy efficiency of the lamps; the electrical match between the PV module and the battery voltage (i.e., MPPT, voltage match, etc); the efficiency of the battery duty cycle; the maximum depth of discharge admitted by the battery; and the idle self-consumption of the battery and BMS. Bidders shall present a detailed technical brief that, based on the certified efficiency of the components prove that the capacities of the PV generator and the battery/ies meet the requirements of this specification. The reference solar radiation to be used is 4.0 kWh/m² for typical winter conditions, however, this factor will have to be adapted depending on the location of the site. The PR used shall consider the match between components and the type of BMS.

During the daytime, the PV generation recharges the battery and supplies the loads (if any). If there are lamps connected during this period, they will be also supplied from this current. The battery's BMS measures the battery's voltage and the current from the PV module/s. When the battery is charged, the BMS curtails the PV generation and shall indicate this status to the user. This is the best condition, for example, to charge the cell phone, digital camera or MP3 through the USB plug.

During the evening, the charged battery supplies the lighting DC loads as needed. A user interface shows the user the status and the remaining capacity. When the battery is too low it shuts down. Service is resumed when the battery has been recharged to a certain set point defined by the manufacturer.

The functional description of the kit can be summarized as follows:

- PV charging the battery while occasionally feeding some loads
- PV generation curtailed with charged battery
- Loads supplied from battery only
- Low battery and loads disconnected

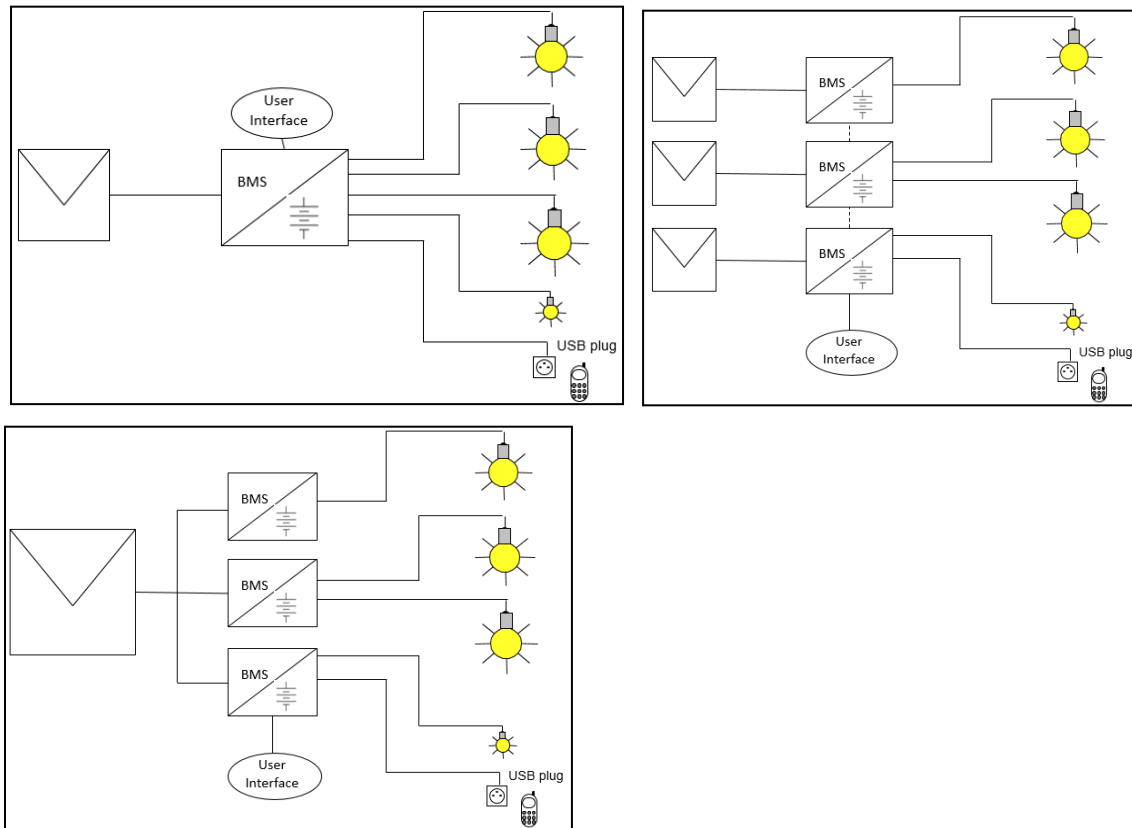
The modes of operation are managed by the user based on common sense and the status indicators provided by the unit.

For safe operation, the kit shall include all the necessary safety protections against short circuit of the wiring and inverted polarity. Electrical shock protection is intrinsic because of the specified safe extra low voltage (SELV).

General layout:

To achieve modularity, robustness and economies of scale, the general design described in this specification is considered a single manufactured package with a performance rating for the complete kit.

The PV lighting kit has one general design and its application can be very universal. It consists of a small photovoltaic generator, a LIB, an integrated BMS with user interface and protections, four high efficiency lamps and switches and plug in cabling. The rating capacity of the main components can be fulfilled by the capacity of each unit or by a modular arrangement of several compatible components in parallel as illustrated in the figures below:



Mechanical design and exposure to environmental conditions:

Although installation is not included in this ITB, the components should ensure that the outdoor support structures and mounting arrangements comply with the environmental conditions and regulations and standards. Attention should be given to wind loads on the outdoor PV generators, their structures and their fasteners so that they withstand up to 120 km/h.

All structures shall be made of corrosion resistant materials. The same applies to all bolts, nuts, and fasteners (when required/included).

Outdoor PV generator cabling and associated components are exposed to UV, wind, water and other environmental conditions and shall be fit for this purpose and built in such a way as to minimize exposure to detrimental environmental effects.

Safety issues:

Protection against electric shock

Protection against electric shock is achieved intrinsically by the use of extra-low voltage (SELV) together with components classified as Class III or better.

Protection against fire

Direct current (DC) systems and photovoltaic generators pose various hazards, for example the ability to produce and sustain electrical arcs with currents that are not much greater than normal operating currents. In this case, this risk is reduced intrinsically by the voltage rating. All the plug-in sockets must be rated for DC current at the maximum design current.

Protection against over current

Battery over current protection: The battery BMS shall be integrated with the battery and include over current and short circuit protection of the input and output cabling connected to it. Risk of reverse polarity connection has to be also mechanically avoided by the choice of plug technology and size.

3.b.1.2. Equipment specifications

Photovoltaic Lighting kits:

The main specification of the kits is the minimum final output requirement. The PV kits shall provide the lighting level from the battery for the required number of hours and be able to recharge the battery with the PV generator exclusively. The total minimum illuminance is of 2250 lumens provided by at least 3 lamps of 700 lm each, one small courtesy lamp of 150 lm and the USB mobile Phone charging connection. The daily average required illumination period is of 7 hours and the reference PR (performance Ratio) is 0.7 to size the PV generator.

EC compliance is mandatory.

GENERAL SPECIFICATIONS		
Lights and loads	Lamp type	LED indoor
	Operating voltage range	10 to 15 V _{DC}
	Illuminance, each room lamp/s	≥ 700 lumens
	Illuminance, small courtesy lamp	≥ 150 lumens
	Number of room's lamps	≥ 3 units
	Number of small courtesy lamps	1 unit
	Lamp efficiency	≥ 75 Lm/W
	Lamp lifespan	≥ 20,000 hours
	Lamp illumination efficiency (L95)	≥ 2,000
	Lamp use	≥ 7 h/day
	Total minimum lighting requirements	≥ 15,750 lm-h/day
	USB mobile phone charging	
User interface in battery enclosure	Information	-Charging status -Load-disconnect state (or over discharge protection status) -Indicative state of charge or remaining available capacity or time
	Alarms	-Low battery state of charge / Low battery voltage / Low available capacity -Load disconnect -Battery fully charged
Photovoltaic generator	Type of module/s	Crystalline Silicon
	Tilt	latitude +5° (when possible)

	Reference Solar in plane average radiation (for calculations)	4.0 kWh/m ²
Battery and charge controller	Type	Lithium based
	Rated Voltage	12 V
	Autonomy at the rated daily load.	≥ 1.5 days
	Battery PV charge controller	integrated
	Discharge/recharge full cycles	≥ 1.800
	Modular multi battery solution allowed	yes
Cables and switches	Distance between the PV generator and the battery	≥ 6m
	Distance between the battery and each lamp	≥ 5m
	Additional extension cable for lamp or PV module. 1 unit	≥ 5m
	Cable connection plugs	included
	Switches	In the cables or in the lamps

3.b.1.3. Components

Data Sheets:

Although the kits are considered one functional unit that has to provide the final service requirements they consist of several interconnected components. Bidders are requested to provide details and data sheets that clearly show the specifications of the components to be supplied.

PV Generator:

PV module(s)

They shall be crystalline silicon PV modules that comply with the norm IEC 61215 edition 2 and shall be qualified to and be classified by Class according to IEC 61730.

The voltage rating shall be compatible with the battery voltage. Mismatch losses to be considered.

Amorphous silicon and other thin film type cells are not acceptable under this tender.

PV capacity

PV capacity is dependent on the efficiency of the lamps, battery and self-consumption of the components included in the kits. Lower efficiency can be offset by larger PV capacity and vice-versa.

It is up to the Bidder to offer what he considers the most cost effective design as long as the minimum light service requirements are met.

As an indication and for the minimum lighting requirements of 15,750 lm·h/day, some examples for the PV capacity are presented:

Lamp efficiency	Considerations	PV capacity
75 lm/W	PR= 0.7 (without MPPT) or 0.75 (with MPPT) Gdy= 4.0 kWh/m ²	75 Wp/ 70 Wp
90 lm/W		63 Wp/58 Wp
100 lm/W		56 Wp/53 Wp

Cables

For the purpose of this ITB the typical distance between the PV generator and the battery is 6 m.

Cables used for the PV generator shall be Cu and have a temperature rating higher than 40°C above ambient temperature; be UV-resistant and be flexible (multithreaded).

Cable ties or appropriate fastening means have to be compatible with outdoor use.

Disconnecting means

Disconnecting means shall be provided for the PV generator to isolate it from the battery safely.

Support Structure

The PV modules' supports frames shall be anchored outdoor of the selected sites with great attention to the tilt, orientation and shades.

The support frame shall be of either lightweight aluminium or galvanized steel and it shall be easy for installation and maintenance.

Electrical Storage – LIB:

LIB:

Application

The battery feeds the loads (i.e. lamps and auxiliary USB mobile phone charger) on a daily basis. Reliability of service is very important and preference shall be for batteries which have a proven capability under high duty cycle and deep discharge conditions.

Type

The battery should be LIB, deep discharge type with a permissible repeated deep discharge without damage. The type of LIB shall be specified.

Lead acid batteries are not acceptable under this ITB. The batteries should have RoHS certification (for environmental aspects).

Rating

The battery shall have a 12 V_{DC} nominal operating voltage (typically around 12.7 V).

Battery capacity is dependent on the efficiency of the lamps included in the kits, the battery duty cycle efficiency and the allowable depth of discharge. Lower efficiencies can be offset by larger battery capacity and vice-versa. It is up to the Bidder to offer what he considers the most cost effective design as long as the minimum requirements are met (i.e. the battery shall be capable of feeding the lamps during 7 hours/day and have at least an autonomy of 1.5 days without being recharged).

As an indication and for the minimum lighting requirements of 15,750 lm·h/day, some examples for the battery capacity are presented:

Lamp efficiency	Considerations	Battery capacity at 12 V
75 lm/W	Autonomy of 1.5 days	29.2 Ah
90 lm/W	Battery efficiency 0.90	24.3 Ah
100 lm/W	DoD of 100% allowable	21.9 Ah

Battery performance

The battery shall have a self-discharge at room temperature of less than 3% per month (at 23±5°C and fully charged) of its rated capacity.

The battery shall have a Coulombic efficiency of at least 90% on a typical duty cycle.

Lifetime

The design lifetime of the batteries shall be of at least 8 years or 1800 full cycles without losing more than 10% of the rated capacity.

Warranty

Bidders must include a statement of warranties in effect including what specifically is covered under warranty and requirements for obtaining compensation for the kits and (and their components) which have failed under warranty.

Battery Replaceability

The battery should be easily replaced at its end of life.

Labelling

On each battery, the following information has to be provided:

- Manufacturer
- Serial number
- Rated capacity
- Manufacturing date
- Clear indication of the connecting inlets and outlets
- Safety warning

Data sheets

Full technical data sheets shall be provided by the Bidder. These must include:

- Curves showing rated Ah capacity at several discharge rates
- Cycle life versus depth of discharge
- Self-discharge characteristics
- Physical size and weight
- Details of the materials used in construction.

Enclosure and modularity

The battery, its PV charge controller and the user interface shall be integrated in one enclosure. Nevertheless, the ESS of the kit can be made of several independent enclosures/batteries in parallel to achieve the required autonomy rating.

Fuses (short circuit and overcurrent protection)

Automatic protection means shall be rated for DC use and can be solid state and integrated into the battery enclosure. For the PV inlet it shall have a voltage rating equal or greater than $1,2 \times V_{OCpvgr}$, be rated to interrupt fault currents from the battery to the PV generator wiring.

For the loads outlets it shall be rated to interrupt overloads and fault currents from the battery to the lamps cabling.

PV battery charge controller

The PV battery charge controller shall be included in the battery enclosure and shall control the following features:

- photovoltaic generator charging of the battery,
- efficiency
- load control,
- protection functions,
- user interface functions,

User Interface

The user interface shall include any of the following types; LCD screen, LED indicators and, audible alarms.

Required operation information

- An indication of charging status (i.e. charging or not charging).
- An indication of load-disconnect state (or over discharge protection status).
- An indication of the charge remaining in the battery (in time left or state-of-charge indication).

Other additional operational information displayed by the unit may include but is not limited to:

- Battery voltage.
- Charging current.
- Energy input/output.

Compliance shall be determined by inspection of the unit and accompanying user/installation manual.

Alarms

The following conditions should be signaled by the user interface:

- Low battery state of charge / Low battery voltage / Low availability.
- Load disconnect
- Battery management trip (e.g. by over temperature).

Visible alarms, clearly identifiable by the user, shall be triggered within the unit in case of any of the above conditions occurring. If there are audible alarms they shall be time limited and revert to a visible alarm.

Loads:

Lamps

The lifespan of the LED lamps shall be above the 20,000 hours.

The lamps efficiencies shall be higher than 75 Lm/Watt and L95 of minimum 2,000 hours (i.e. the lamps should provide 2,000 hours of Illumination before Illumination dropped to 95% of the Initial Illumination value. Lower efficiency is not acceptable. The colour rating shall be warm white.

USB Mobile phone charger

At least one USB connection from the battery enclosure shall be included. Adaptors for different mobile phone brands shall also be provided.

Cabling

The cabling for the lamps shall be Cu and flexible (multithreaded). The required length is 5 m for each lamp and the cross section must meet the requirement of a maximum voltage drop of 1.5%. However, if during siting and installation, longer distances are detected and the extension cable is required, the cable cross section shall take into account any voltage drop requirements.

Cable ties or appropriate fastening have to be adequate for indoor use in households.

Disconnecting means

Disconnecting means shall be provided for the lamp cables to isolate it from the battery safely.

Switches

The switches can be integrated either to the cables or in the lamps.

Documentation and Training:

The Contractor shall provide data sheets and technical documentation and manuals in **English or French**.

The Contractor shall provide user-easy to use guides for the beneficiaries in English and French with possibility of requirements in other EU language. The guides must be shared and accepted by the UNDP project. It is expected that the guidelines be written on a maximum of 1 A4 paper bounded by a thin film and tapped near the batteries and controller of the PV kit.

3.b.2. LOT 2 and LOT 3

3.b.2.2. Technical requirements – Lot 2

Functional configuration:

In autonomous alternating (AC) plants, the electricity from the PV generator is converted to feed the loads that operate at standard AC electricity. The inverter acts as a voltage source to supply stable AC to the loads from the LIB that allows the match between the intermittent PV energy source and the intermittent or variable consumption requirements.

In Lot 2 the ESS to be supplied and installed consists of LIBs, BMS, autonomous inverters and auxiliary equipment to be integrated in autonomous PV plants to ensure the electricity supply at selected sites.

The PV generator is not included in this ITB. The ESS may integrate an input to connect directly the PV generator or the ESS can be connected in an AC coupling configuration to the rest of the plant components.

The ESS in an autonomous PV plant is sized so that its *practical* capacity endures 1.5 days of autonomy to supply the average daily energy requirements. Typically, A high lifetime (at least 150 cycles per year or 1,500 equivalent full cycles in at least 10 years) is required in combination with a relatively low self-discharge.

The ESS in Lot 2 should ensure the lifetime energy throughput of: 1,500 cycles in 10 years with the following conditions: Temperature 25°C, daily cycles at 40% DoD in 12 hours

During the daytime, the PV generation recharges the LIB and supplies the loads. At night or when the solar generation is limited, the loads are covered by the ESS. The functional description of the ESS can be summarized as follows:

- LIB is charged by the PV generator while PV is also feeding the daily loads
- During daytime and when the LIB is charged, PV generation is curtailed if the loads are fed
- ESS feeds all loads
- Low LIB and loads disconnected

The modes of operation are managed by the user based on common sense and the status indicators provided by the ESS.

For this type of applications, the size may vary from small up to very large capacity. Four categories/Sub Lots are considered within this Lot:

- Sub Lot 2.1 ESS PV-1: From 1 up to 25 kWh
- Sub Lot 2.2 ESS PV-2: From 25 to 200kWh
- Sub Lot 2.3 ESS PV-3: From 200 to 500 kWh
- Sub Lot 2.4 ESS PV-4: From 500 kWh to 1MWh

For safe operation, the ESS shall include all the necessary safety protections against short circuit of the wiring and inverted polarity.

General layout:

To achieve modularity, robustness and economies of scale, the general design described in this specification is considered a package with a performance rating for the ESS.

The ESS consists of the LIB, an integrated BMS, the autonomous inverter, user interface and protections and plug in cabling. The rating capacity of the main components can be fulfilled by the capacity of each unit or by a modular arrangement of several compatible components in parallel.

Bidders should note that a containerized solution for the battery systems may be requested during the secondary bidding process.

Safety issues:

Protection against electric shock

Protection against electric shock in the DC side shall be achieved by best practices and international standards together with components and systems classified as Class II or better.

Protection against fire

DC systems pose various hazards, for example the ability to produce and sustain electrical arcs with currents that are not much greater than normal operating currents. In this case this risk is reduced intrinsically by the voltage rating. All the plug-in sockets must be rated for DC current at the maximum design current.

Protection against over current

The inverter's cable over current protection shall be installed between the battery and the inverter as close as possible to the battery.

Protection against effects of lightning and surge over-voltage

Damage caused by over-voltage is ultimately due to the failure of insulation between live parts or between live parts and earth. The intention of over-voltage protection is to equalize all exposed metallic sections of an installation to a common potential during the event of an over-voltage. Equipotential bonding is therefore required as an important over-voltage protection measure and shall be done in accordance with recognized standards or acceptable state of the art procedures.

3.b.2.3. Technical requirements – Lot 3

Functional configuration:

Multi-source plants, called hybrid plants, are terms used where PV is used in combination with one or more auxiliary sources of power. This means a second power source such as wind or hydroelectric turbines, or also auxiliary dispatch able sources such as fossil-fuelled gensets or even the utility grid. The term dual mode is used to describe the special case of a PV multi-source plant that operates either in parallel with an external AC grid (grid-dependent) or as an autonomous AC source (off-grid) when the forming source is off.

Multi-source plants are usually designed to provide continuous grid equivalent electrical service during the night or during unfavorable weather conditions and with a high fraction of the energy being delivered by the solar facility. During sunny weather, the consumer's demand is met by the PV generator and surplus generation is stored in the battery. If needed, a back-up genset can simultaneously supply both the loads and charge the battery. If adequately sized, this set up has high reliability and avoids the need for an oversized PV generator.

- **Uninterruptible Power Supply (UPS) /back-up:**
The battery is used for the provision of electricity to all (or only critical) loads during blackouts which can be produced by the low quality of the main utility grid or when the diesel genset is off. In this case, the battery should be able to cover the loads but for a shorter period of time than off-grid autonomous PV plants (the ESS should be sized to cover the loads at least during the blackout period). In this type of application, the ESS can be considered Uninterruptible Power Supply (UPS).
- **Time-shift:**
ESS can also, in some applications, create economic value through energy trading via "storing-selling-consumption": Storage of electrical energy in off-peak periods when the price of energy is low followed by discharge of this energy in on-peak periods when energy prices are high. Typical duration is 1 to 6 hours, daily cycle.
- **Peak-shaving:**

In multisource plants, ESS can also be used to reduce the peak load demand from the grid or the genset (this type of application is named Peak shaving). In applications where the genset capacity or the contracted power from the grid is lower than the peak demand, the difference can be covered by the ESS. In this case, the ESS is sized to be able to satisfy the energy demand and off-set the power difference. The discharged duration is between 1 to 5 hours per day.

For this ITB, the ESS to be supplied and installed consists of LIBs, BMS, dual-mode inverters and auxiliary equipment to be integrated in PV hybrid plants ensuring the continuity of electricity supply at selected sites.

The PV generator is not included in this ITB. The ESS may integrate an input to connect directly the PV generator or the ESS can be connected in an AC coupling configuration to the rest of the plant components.

The ESS in a multisource PV plant is sized so that its *practical* capacity endures 1 to 6 hours of autonomy to supply the loads when required (during peak load, blackout or time shifting). In this case, the battery may cycle up to 3 or 4 times a day, thus at least 1,000 cycles per year or 10,000 equivalent full cycles in at least 10 years is required in combination with a relatively low self-discharge.

The ESS in Lot 3 should ensure the lifetime energy throughput of: 10,000 cycles in 10 years with the following conditions: Temperature 25°C, 3 daily cycles at 90% DoD in 4 hours)

The functional description of the ESS can be summarized as follows:

- LIB is charged (preferably) by the PV while PV and/or the auxiliary sources are feeding the daily loads
- ESS feeds all or critical loads (as only energy source)
- ESS feeds partially the loads (in peak shaving or time shifting configuration)

Depending on the complexity of the system, the modes of operation are automatically triggered by an Energy and Management System, called EMS, based on conditions such as state of charge of the battery, PV generation and conditions of the day: switch off certain loads, charging exclusively from PV or not, etc. Therefore, the supply or installation of ESS in sites where a EMS is required will be treated separately.

For this type of applications, the size may vary from small up to very large capacity. Four categories/ Sub Lots are considered within this Lot:

- Sub Lot 3.1 ESS MS-1: From 1 up to 25 kWh
- Sub Lot 3.2 ESS MS-2: From 25 to 200kWh
- Sub Lot 3.3 ESS MS-3: From 200 to 500 kWh
- Sub Lot 3.4 ESS MS-4: From 500 kWh to 1MWh

For safe operation, the ESS shall include all the necessary safety protections against short circuit of any external wiring and inverted polarity.

General layout:

To achieve modularity, robustness and economies of scale, the general design described in this specification is considered a package with a performance rating for the ESS.

The ESS consists of the LIB, an integrated BMS, the dual-mode inverter, user interface and protections and plug in cabling. The rating capacity of the main components can be fulfilled by the capacity of each unit or by a modular arrangement of several compatible components in parallel.

For actual requests during secondary bidding, a containerized solution may be requested for the battery systems during the secondary bidding process.

Safety issues:

Protection against electric shock

Protection against electric shock in the DC side shall be achieved by best practices and international standards together with components and systems classified as Class II or better.

Protection against fire

DC systems pose various hazards, for example the ability to produce and sustain electrical arcs with currents that are not much greater than normal operating currents. In this case, this risk is reduced intrinsically by the voltage rating. All the plug-in sockets must be rated for DC current at the maximum design current (if the solution is not in a closed enclosure).

Protection against over current

The inverter's cable over current protection shall be installed between the battery and the inverter as close as possible to the battery.

Protection against effects of lightning and surge over-voltage

Damage caused by over-voltage is ultimately due to the failure of insulation between live parts or between live parts and earth. The intention of over-voltage protection is to equalize all exposed metallic sections of an installation to a common potential during the event of an over-voltage. Equipotential bonding is therefore required as an important over-voltage protection measure and shall be done in accordance with recognized standards or acceptable state of the art procedures.

3.b.2.4. Equipment Specifications (Lot 2 and Lot 3)

General Specifications:

Lithium-ion battery	Rated storage capacity (kWh)	ESS PV-1	1 - 25
		ESS PV-2	25 – 200
		ESS PV-3	200 – 500
		ESS PV-4	500 – 1,000
		ESS MS-1	1 - 25
		ESS MS-2	25 – 200
		ESS MS-3	200 – 500
		ESS MS-4	500 – 1,000
	Type	Lithium based	
	Rated cycles at 90% DoD (lifetime)	Lot 2	> 1,500 cycles
		Lot 3	> 10,000 cycles
	Equivalent operation	Lot 2	365 full cycles/year at 40% of DoD
		Lot 3	300-1000 full cycles/year at 80-90% DoD
	Discharge current	Lot 2	0.02C – 0.1C (of the battery)
		Lot 3	0.5C – 2C (of the battery)
	Charge current	Lot 2	0.05C – 0.2C (of the battery)
		Lot 3	0.2C – 0.5C (of the battery)
	Rated service life time	≥ 10 years	
	Control	Integrated BMS for safety and operation	
	Self-discharge	< 5% per month	
	Max efficiency (charge & discharge)	> 90%	
	Standards and certificates	CE; EN 61000-6;	
		Transport: UN38.3 or equivalent	

IEC 62619:2017

ESS	Dual Mode Inverter	Rated capacity (kW)	ESS PV-1	P1 (capable of discharging the 40% battery in 12 hours)
			ESS PV-2	P2 (capable of discharging the 40% battery in 12 hours)
			ESS PV-3	P3 (capable of discharging the 40% battery in 12 hours)
			ESS PV-4	P4 (capable of discharging the 40% battery in 12 hours)
			ESS MS-1	P1 (capable of discharging the 90% battery in 4 hours)
			ESS MS-2	P2 (capable of discharging the 90% battery in 4 hours)
			ESS MS-3	P3 (capable of discharging the 90% battery in 4 hours)
			ESS MS-4	P4 (capable of discharging the 90% battery in 4 hours)
		Power 5 sec (kW)	ESS PV-1	2 x P1
			ESS PV-2	2 x P2
			ESS PV-3	2 x P3
			ESS PV-4	2 x P4
			ESS MS-1	2 x P1
			ESS MS-2	2 x P2
			ESS MS-3	2 x P3
			ESS MS-4	2 x P4
		Designed for an electrical grid of	230 V and 50Hz or 110 and 60Hz (Based on the selected sites)	
		Discharge current	Lot 2	0.02C – 0.1C (of the battery)
			Lot 3	0.5C – 2C (of the battery)
		Charge current	Lot 2	0.05C – 0.2C (of the battery)
			Lot 3	0.2C – 0.5C (of the battery)
		Inverter function	Yes	
		Charger function	Yes	
		Assistance to the grid	Yes	
		Anti -islanding protection	Yes/ VDE 0126-1-1 or similar	
	Additional requirements		Dynamic compensation of reactive power, inverter automatic reconnection conditions, utility-interactive photovoltaic inverter system.	
	Standards		EMC 2004/108/EC; EN 61000-1; EN 6100-2; EN 61000-3; EN 61000-6; EN 62040-2 (when applicable) Low voltage directive: 2006/95/EC (where applicable); EN 621091; EN 621092 EN 500178	
	Monitoring		The ESS should avail monitoring data to a third monitoring facility that will perform the remote monitoring of the PV plant	
	Communication		MODBUS or CAN (with communication bridge if required), allowing the option to be read by a third monitoring device/datalogger	

3.b.2.5. Components

Battery:

Type

The use of lithium based batteries is mandatory. The type of battery used shall be described in the offer.

Rating

The LIB nominal operation voltage is to be described in the offer. The LIB may be made up by one battery module or by several, but the price quoted shall be for a complete battery of the required capacity.

The total capacity shall be detailed in the tender.

LIB performance

The ESS operational temperature range shall be at least from – 10°C to +50°C.

The ESS shall have a self-discharge, when new, of less than 5% per month (at 25°C and fully charged) of its nominal capacity. The battery shall have charging and discharging efficiency of at least 90%.

For Lot 2: The LIB cycle life for regular cycles down to 40% DoD shall be more than 4,000 cycles; equivalent to 1,500 full cycles in 10 years.

For Lot 3: The LIB cycle life for regular cycles down to 90% DoD shall be more than 10,000 cycles in 10 years.

Tenders must include details or the results of any tests carried out on the batteries by independent laboratories particularly regarding performance in conditions equivalent to solar equipment located in moist, equatorial coastal locations shall be included.

Lifetime

The design lifetime of the batteries shall be of at least 10 years without losing more than 20% of the rated capacity.

Battery management system

Embedded control with at least the following features:

- Recharge algorithm with battery temperature compensation
- Voltage and current supervision and voltage settings adjustable
- Calculation of battery SoC: Based on energy balance and operating conditions of the battery
- Safety (disconnect when required)
- Thermal monitoring and management
- Provide warning and alarms

Labelling

On each ESS the following information has to be provided:

- Manufacturer
- Serial number
- Rated capacity
- Manufacturing date

- Clear indication of the positive and negative terminal
- Safety warning as needed

Data sheets and technical documentation

Full technical data sheets and technical documentation shall be provided. These must include:

- Cycle life versus depth of discharge
- Physical size and weight
- Self-discharge characteristics
- Total and practical Capacity
- Charging and discharging rates
- Interface details
- Details of the type of technology
- Warranties
- Compliant standards
- Safety warning and advice how to handle batteries
- Maintenance and replacement procedure
- Range of operating temperature and storage temperature

Warranty

Bidders must include a statement of warranties in effect including what specifically is covered under warranty and requirements for obtaining compensation for batteries which have failed under warranty.

Autonomous Inverter (Lot 2):

The provided inverter will be multi functions, bidirectional, and sine-wave inverter.

Type of Inverter

The inverter may be an inverter of the same brand/manufacturer than the battery or from an independent manufacturer. When battery and inverter are from different manufacturers, compatibility shall be ensured and the operation of the proposed system is to be demonstrated with references from previous projects.

The inverter shall comply with the following features:

- Multi-mode sinewave inverter
- Rated voltage equivalent to the battery voltage
- Rated power shall be included in the Offer (as P_{inv}) capable of discharging the 40% battery in 12 hours
- Power for 5 seconds $2 \times P_{nom}$
- Maximum efficiency above 96% at rated power
- Rated output voltage $230V \pm 2\%$ or $110V \pm 2\%$
- Frequency $50Hz \pm 0.1\%$ or $60Hz \pm 0.1\%$
- Battery charger current: $0.05C - 0.2C$ (of the battery)
- Battery discharge current: $0.02C - 0.1C$ (of the battery)

The Bidder shall also supply all ancillary necessary equipment for the configuration of the autonomous inverters.

Standards

Inverter must in all respects comply with the following standards:

- EMC 2004/108/EC CE compatibility
- IEC 61000-1;
- IEC 61000-3 (depending on inverter's capacity)
- IEC 61000-6

- EN 62040-2 (when applicable)

Low voltage directive:

- 2006/95/EC (where applicable)
- EN 62109-1
- EN 62109-2
- EN 50178

Labelling

On each inverter, the following information has to be provided:

- Manufacturer's name, if the Bidder is not the manufacturer the address of the Bidder must be indicated
- Serial n°
- Type of Inverter
- Nominal Power
- Date of manufacture

Lifetime and warranties

The Bidder has to provide a replacement warranty of at least 5 years and the expected lifetime should be of at least 10 years.

Bidders must include a statement of warranties in effect including what specifically is covered under warranty and requirements for obtaining compensation for Inverter which have failed under warranty.

Information required from Bidders:

Full technical specifications shall be provided by the Bidder and additional documentation

These must include:

- Efficiency curve
- Data-sheet with principal characteristics
- Physical size and weight
- Details of the materials used in construction.
- Safety warning and advice how to install equipment
- Maintenance and replacement procedure

Dual-mode Inverter (Lot 3):

The multi-mode inverter shall be a bidirectional sinusoidal inverter. It can operate in autonomous mode as well as grid-tied mode through a transfer switch. It also requires some additional special functions:

- The operating parameters of the unit shall be configurable as to adjust the power ratings of each functionality (voltage control inverter, current control inverter, charger and boost). A lower threshold of battery voltage for the boost function shall be established to ensure an energy reserve for the blackout situation.
- A boost function which can add power from the DC side to the AC source from the grid according to the input limit current that shall be configured.
- A RE priority function which adjusts the instantaneous power consumed from the source according to the battery voltage. The operation of the solar priority function shall be done with an automatic adjustment algorithm of the input limit current. The input limit current is decreased, if there is enough energy available at the DC side, from the initial value (that will be established by the UNDP's

representative). The lower the input current, more power to the load is provided from the DC side by the boost function.

The Bidder shall have the possibility to supply one inverter remote control unit that shall be used for the configuration of all the inverters.

The inverter shall comply with the following features:

- Multi-mode sinewave inverter
- Rated voltage equivalent to the battery voltage
- Rated power shall be included in the Offer (as P_{inv}) capable of discharging the 90% battery in 4 hours
- Power for 5 seconds $2 \times P_{nom}$
- Maximum efficiency above 96% at rated power
- Rated output voltage $230V \pm 2\%$ or $110V \pm 2\%$ (to be detailed in the offer)
- Frequency $50Hz \pm 0.1\%$ or $60Hz \pm 0.1\%$ (to be detailed in the offer)
- Battery charger current: $0.2C - 0.5C$ (of the battery)
- Battery discharge current: $0.5C - 2C$ (of the battery)
- Power Frequency Shift function
- Grid Assistance Function
- Output power control from a third device (read and write capabilities)

The Bidder shall also supply all ancillary necessary equipment for the configuration of the dual-mode inverters.

Standards:

Inverter must in all respects comply with the following standards:

- EMC 2004/108/EC CE compatibility
- IEC 61000-1;
- IEC 61000-3 (depending on inverter's capacity)
- EN 61000-6
- EN 62040-2 (when applicable)

Low voltage directive:

- 2006/95/EC (where applicable)
- EN 62109-1
- EN 62109-2
- EN 50178

Labelling

On each inverter, the following information has to be provided:

- Manufacturer's name, if the Bidder is not the manufacturer the address of the Bidder must be indicated
- Serial n°
- Type of Inverter
- Nominal Power
- Date of manufacture

Lifetime and warranties

The Bidder has to provide a replacement warranty of at least 2 years and the expected lifetime should be of at least 10 years.

Bidders must include a statement of warranties in effect including what specifically is covered under warranty and requirements for obtaining compensation for Inverter which have failed under warranty.

Information required from Bidders:

Full technical specifications shall be provided by the Bidder and additional documentation

These must include:

- Efficiency curve
 - Data-sheet with principal characteristics
 - Physical size and weight
 - Details of the materials used in construction
 - Safety warning and advice how to install equipment
 - Maintenance and replacement procedure
-

Section 3c: Additional Related Services

Further to the Schedule of Requirements in the preceding Table, Bidders are requested to take note of the following additional requirements, conditions, and related services pertaining to the fulfillment of the requirements:

Delivery Term [INCOTERMS 2010] <i>(Pls. link this to price schedule)</i>	<input checked="" type="checkbox"/> For this ITB, EXW pricing is required (for secondary bidding, FCA or DAP may be requested)
UNDP Preferred Freight Forwarder, if any ⁹	Vendor should be able to work with UNDP assigned Freight Forwarders during project delivery
Distribution of shipping documents <i>(if using freight forwarder)</i>	To be specified per order
Ex-factory / Pre-shipment inspection	Na
Inspection upon delivery	Na
Installation Requirements	Vendor must have installation capability available if required, through local/regional representation or in-house engineers/ technical team
Testing Requirements	Na
Scope of Training on Operation and Maintenance	Vendor must have training capability available if required, through local/ regional representation or in-house engineers/ training team
Commissioning	Vendor must have installation capability if necessary (see Installation above)
Technical Support Requirements	Vendor must have technical support available if necessary either through local/ regional representation or in-house engineers/ technical team.
After-sale services required	<input checked="" type="checkbox"/> Warranty requirements per component as per TORs <input checked="" type="checkbox"/> Technical Support <input checked="" type="checkbox"/> Provision of Service Unit when pulled out for maintenance/ repair <input checked="" type="checkbox"/> Ability to offer disposal of components if required (at end of life)
All documentations, including catalogs, instructions and operating manuals, shall be in	<input checked="" type="checkbox"/> English for this ITB (but supplier must be able to offer these documents in French if required).

⁹A factor of the Incoterms stipulated in the ITB. The use of a UNDP preferred courier may be considered for purposes of ensuring forwarder's familiarity with procedures and processing of documentary requirements applicable to UNDP when clearing with customs authority of the country of destination.

this language	
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Section 4: Bid Submission Form¹⁰

(This should be written in the Letterhead of the Bidder. Except for indicated fields, no changes may be made in this template.)

Insert: Location

Insert: Date

To: [insert: Name and Address of UNDP focal point]

Dear Sir/Madam:

We, the undersigned, hereby offer to supply the goods and related services required for [insert: title of goods and services required as per ITB] in accordance with your Invitation to Bid dated Insert: bid date. We are hereby submitting our Bid, which includes the Technical Bid and Price Schedule.

We hereby declare that:

- a) All the information and statements made in this Bid are true and we accept that any misrepresentation contained in it may lead to our disqualification;
- b) We are currently not on the removed or suspended vendor list of the UN or other such lists of other UN agencies, nor are we associated with, any company or individual appearing on the 1267/1989 list of the UN Security Council;
- c) We have no outstanding bankruptcy or pending litigation or any legal action that could impair our operation as a going concern; and
- d) We do not employ, nor anticipate employing, any person who is or was recently employed by the UN or UNDP.

We confirm that we have read, understood and hereby fully accept the Schedule of Requirements and Technical Specifications describing the duties and responsibilities required of us in this ITB, and the General Terms and Conditions of UNDP's Standard Contract for this ITB.

We agree to abide by this Bid for [insert: period of validity as indicated in Data Sheet].

We undertake, if our Bid is accepted, to initiate the supply of goods and provision of related services not later than the date indicated in the Data Sheet.

We fully understand and recognize that UNDP is not bound to accept this Bid, that we shall bear all costs associated with its preparation and submission, and that UNDP will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the evaluation.

¹⁰ No deletion or modification may be made in this form. Any such deletion or modification may lead to the rejection of the Bid.

We remain,

Yours sincerely,

Authorized Signature [*In full and initials*]: _____

Name and Title of Signatory: _____

Name of Firm: _____

Contact Details: _____

[Please mark this letter with your corporate seal, if available]

Section 5: Documents Establishing the Eligibility and Qualifications of the Bidder

Bidder Information Form¹¹

Date: *[insert date (as day, month and year) of Bid Submission]*

ITB No.: *[insert number of bidding process]*

Page _____ of _____ pages

1. Bidder's Legal Name <i>[insert Bidder's legal name]</i>		
2. In case of Joint Venture (JV), legal name of each party: <i>[insert legal name of each party in JV]</i>		
3. Actual or intended Country/ies of Registration/Operation: <i>[insert actual or intended Country of Registration]</i>		
4. Year of Registration in its Location: <i>[insert Bidder's year of registration]</i>		
5. Countries of Operation	6. No. of staff in each Country	7. Years of Operation in each Country
8. Legal Address/es in Country/ies of Registration/Operation: <i>[insert Bidder's legal address in country of registration]</i>		
9. Value and Description of Top three (3) Biggest Contract for the past five (5) years		
10. Latest Credit Rating (Score and Source, if any)		
11. Brief description of litigation history (disputes, arbitration, claims, etc.), indicating current status and outcomes, if already resolved.		
12. Bidder's Authorized Representative Information Name: <i>[insert Authorized Representative's name]</i> Address: <i>[insert Authorized Representative's Address]</i> Telephone/Fax numbers: <i>[insert Authorized Representative's telephone/fax numbers]</i> Email Address: <i>[insert Authorized Representative's email address]</i>		
13. Are you in the UNPD List 1267.1989 or UN Ineligibility List? <input type="checkbox"/> YES or <input type="checkbox"/> NO		

¹¹ The Bidder shall fill in this Form in accordance with the instructions. Apart from providing additional information, no alterations to its format shall be permitted and no substitutions shall be accepted.

14. Attached are copies of original documents of:

- ☐ All eligibility document requirements listed in the Data Sheet
- ☐ If Joint Venture/Consortium – copy of the Memorandum of Understanding/Agreement or Letter of Intent to form a JV/Consortium, or Registration of JV/Consortium, if registered
- ☐ If case of Government corporation or Government-owned/controlled entity, documents establishing legal and financial autonomy and compliance with commercial law.

Joint Venture Partner Information Form (if Registered)¹²

Date: *[insert date (as day, month and year) of Bid Submission]*

ITB No.: *[insert number of bidding process]*

Page _____ of _____ pages

1. Bidder's Legal Name: <i>[insert Bidder's legal name]</i>		
2. JV's Party legal name: <i>[insert JV's Party legal name]</i>		
3. JV's Party Country of Registration: <i>[insert JV's Party country of registration]</i>		
4. Year of Registration: <i>[insert Party's year of registration]</i>		
5. Countries of Operation	6. No. of staff in each Country	7. Years of Operation in each Country
8. Legal Address/es in Country/ies of Registration/Operation: <i>[insert Party's legal address in country of registration]</i>		
9. Value and Description of Top three (3) Biggest Contract for the past five (5) years		
10. Latest Credit Rating (if any): Click here to enter text.		
1. Brief description of litigation history (disputes, arbitration, claims, etc.), indicating current status and outcomes, if already resolved. Click here to enter text.		

¹² The Bidder shall fill in this Form in accordance with the instructions. Apart from providing additional information, No alterations to its format shall be permitted and no substitutions shall be accepted.

13. JV's Party Authorized Representative Information

Name: *[insert name of JV's Party authorized representative]*

Address: *[insert address of JV's Party authorized representative]*

Telephone/Fax numbers: *[insert telephone/fax numbers of JV's Party authorized representative]*

Email Address: *[insert email address of JV's Party authorized representative]*

14. Attached are copies of original documents of: *[check the box(es) of the attached original documents]*

- ☐ All eligibility document requirements listed in the Data Sheet
- ☐ Articles of Incorporation or Registration of firm named in 2.
- ☐ In case of government owned entity, documents establishing legal and financial autonomy and compliance with commercial law.

Section 6: Technical Bid Form¹³

INSERT TITLE OF THE ITB

Name of Bidding Organization / Firm:	
Country of Registration:	
Name of Contact Person for this Bid:	
Address:	
Phone / Fax:	
Email:	

PART 1: EXPERTISE OF FIRM/ ORGANISATION

This section should fully explain the Bidder's resources in terms of personnel and facilities necessary for the performance of this requirement.

1.1 Brief Description of Bidder as an Entity: Provide a brief description of the organization / firm submitting the Bid, its legal mandates/authorized business activities, the year and country of incorporation, and approximate annual budget, etc. Include reference to reputation, or any history of litigation and arbitration in which the organisation / firm has been involved that could adversely affect or impact the delivery of goods and/or performance of related services, indicating the status/result of such litigation/arbitration.

1.2. Financial Capacity: Based on the latest Audited Financial Statement (Income Statement and Balance Sheet) describe the financial capacity (liquidity, stand-by credit lines, etc.) of the bidder to engage into the contract. Include any indication of credit rating, industry rating, etc.

1.3. Track Record and Experiences: Provide the following information regarding corporate experience within at least the last five (5) years which are related or relevant to those required for this Contract.

Name of project	Client	Contract Value	Period of activity	Types of activities undertaken	Status or Date Completed	References Contact Details (Name, Phone, Email)

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¹³ Technical Bids not submitted in this format may be rejected.

PART 2 - SCOPE OF SUPPLY, TECHNICAL SPECIFICATIONS, AND RELATED SERVICES

This section should demonstrate the Bidder's responsiveness to the specification by identifying the specific components proposed, addressing the requirements, as specified, point by point; providing a detailed description of the essential performance characteristics proposed; and demonstrating how the proposed bid meets or exceeds the specifications.

2.1. Scope of Supply: Please provide a detailed description of the goods to be supplied, indicating clearly how they comply with the technical specifications required by the ITB (see below table); describe how the organisation/firm will supply the goods and any related services, keeping in mind the appropriateness to local conditions and project environment.

Item No.	Description/ Specification of Goods	Source/ Manufacturer	Country of Origin	Qty	Quality Certificate/ Export Licences, etc. (indicate all that applies and if attached)

A supporting document with full details may be annexed to this section

2.2. Technical Quality Assurance Mechanisms: The bid shall also include details of the Bidder's internal technical and quality assurance review mechanisms, all the appropriate quality certificates, export licenses and other documents attesting to the superiority of the quality of the goods and technologies to be supplied.

2.3. Reporting and Monitoring: Please provide a brief description of the mechanisms proposed for this project for reporting to the UNDP and partners, including a reporting schedule.

2.4. Subcontracting: Explain whether any work would be subcontracted, to whom, how much percentage of the work, the rationale for such, and the roles of the proposed sub-contractors. Special attention should be given to providing a clear picture of the role of each entity and how everyone will function as a team.

2.5. Risks / Mitigation Measures: Please describe the potential risks for the implementation of this project that may impact achievement and timely completion of expected results as well as their quality. Describe measures that will be put in place to mitigate these risks.

2.6 Implementation Timelines: The Bidder shall submit a Gantt Chart or Project Schedule indicating the detailed sequence of activities that will be undertaken and their corresponding timing.

2.7. Partnerships (Optional): Explain any partnerships with local, international or other organizations that are planned for the implementation of the project. Special attention should be given to providing a clear picture of the role of each entity and how everyone will function as a team. Letters of commitment from partners and an indication of whether some or all have successfully worked together on other previous projects is encouraged.

2.8. Anti-Corruption Strategy (Optional): Define the anti-corruption strategy that will be applied in this project to prevent the misuse of funds. Describe the financial controls that will be put in place.

2.9 Statement of Full Disclosure: This is intended to disclose any potential conflict in accordance with the definition of "conflict" under Section 4 of this document, if any.

2.10 Other: Any other comments or information regarding the bid and its implementation.

PART 3: PERSONNEL

3.1 Management Structure: Describe the overall management approach toward planning and implementing the contract. Include an organization chart for the management of the contract, if awarded.

3.2 Staff Time Allocation: Provide a spreadsheet will be included to show the activities of each personnel involved in the implementation of the contract. Where the expertise of the personnel is critical to the success of the contract, UNDP will not allow substitution of personnel whose qualifications had been reviewed and accepted during the bid evaluation. (If substitution of such a personnel is unavoidable, substitution or replacement will be subject to the approval of UNDP. No increase in costs will be considered as a result of any substitution).

3.3 Qualifications of Key Personnel. Provide the CVs for key personnel (Team Leader, Managerial and general staff) that will be provided to support the implementation of this project. CVs should demonstrate qualifications in area of expertise relevant to the Contract. Please use the format below:

Name:		
Role in Contract Implementation:		
Nationality:		
Contact information:		
Countries of Relevant Work Experience:		
Language Skills:		
Education and other Qualifications:		
Summary of Experience: <i>Highlight experience in the region and on similar projects.</i>		
Relevant Experience (From most recent):		
Period: From – To	Name of activity/ Project/ funding organisation, if applicable:	Job Title and Activities undertaken/Description of actual role performed:
<i>e.g. June 2010-January 2011</i>		
<i>Etc.</i>		
<i>Etc.</i>		
References (minimum of 3):	<i>Name</i> <i>Designation</i> <i>Organization</i> <i>Contact Information – Address; Phone; Email; etc.</i>	
Declaration:		
<p>I confirm my intention to serve in the stated position and present availability to serve for the term of the proposed contract. I also understand that any wilful misstatement described above may lead to my disqualification, before or during my engagement.</p> <p>_____</p> <p>_____</p> <p>Signature of the Nominated Team Leader/Member Date Signed</p>		

Section 7: Price Schedule Form¹⁴

The Bidder is required to prepare the Price Schedule as indicated in the Instruction to Bidders.

As detailed in Section 3.a.4 above:

Lot 1: Price will be EXW unit price in USD

Lots 2 and 3: The price (USD/kWh) will be calculated based on:

- Acquisition and WARRANTY PRICE (AWP) (in USD): EXW price of the battery system (USD) including warranty extension (if required to reach the 5 years' performance warranty):
 - o AWP (USD) = EXW price + warranty extension
- ENERGY THROUGHPUT (ETP) (in kWh): Energy through put during life ownership, equivalent to the practical capacity x usable cycles in 10 years:
 - o Lot 2: Practical capacity x 1,500 cycles
 - o Lot 3: Practical capacity x 10,000 cycles

Cost Breakdown by Lots and Sub-lots:

¹⁴ To the extent possible UNDP would like your offer to follow the format provided. Some modifications might be necessary for the purpose of the tender.

Lot 1: Solar PV Lighting Kits			USD FCA cost per unit			Volume Discount unit price (FCA) for > 100 units	Volume Discount unit price (FCA) for > 1,000 units	Volume Discount unit price (FCA) for > 10,000 units
Lot 2: Autonomous AC Plants			Practical Capacity in kWh*	Acquisition Cost (FCA)	Warranty Extension Cost**	AWP (acquisition cost plus warranty cost)	ETP (kWhx1,500x10)	USD/kWh
	Sub-Lot 1	ESS PV-1: 25 kWh						
	Sub-Lot 2	ESS PV-1: 200 kWh						
	Sub-Lot 3	ESS PV-1: 500 kWh						
	Sub-Lot 4	ESS PV-1: 1 MWh						
Lot 3: Multisource (MS) PV Plants			Practical Capacity in kWh*	Acquisition Cost (FCA)	Warranty Extension Cost**	AWP (acquisition cost plus warranty cost)	ETP (kWhx10,000x10)	USD/kWh
	Sub-Lot 1	ESS MS-1: 25 kWh						
	Sub-Lot 2	ESS MS-1: 200 kWh						
	Sub-Lot 3	ESS MS-1: 500 kWh						
	Sub-Lot 4	ESS MS-1: 1 MWh						

* Practical Capacity conditions for Lot 2: if the battery works at temperature 25°C, daily cycles at 40% DoD in 12 hours; for Lot 3: if the battery works at temperature 25°C, 3 daily cycles at 90% DoD in 4 hours

** Only if not already included in the acquisition cost (at least 5 yrs warranty required)

Section 8: Contract

THIS IS UNDP'S TEMPLATE FOR CONTRACT FOR THE BIDDER'S REFERENCE. ADHERENCE TO ALL TERMS AND CONDITIONS IS MANDATORY.

LONG TERM AGREEMENT FOR THE PROVISION OF GOODS & SERVICES

TO THE UNITED NATIONS DEVELOPMENT PROGRAMME

This Long Term Agreement is made between the United Nations Development Programme, a subsidiary organ of the United Nations, having its headquarters at 1 UN Plaza, New York, NY 10017 (hereinafter "UNDP") and _____ (hereinafter called "Contractor") with its headquarters at _____.

WHEREAS, UNDP desires to enter into a Long Term Agreement for the provision of services by the Contractor to UNDP, pursuant to which UNDP country offices world-wide can conclude specific contractual arrangements with the Contractor, as provided herein;

WHEREAS pursuant to the Request for Proposal[to complete] the offer of the Contractor was accepted;

NOW, THEREFORE, UNDP and the Contractor (hereinafter jointly the "Parties") hereby agree as follows:

Article 1: SCOPE OF WORK

1. The Contractor shall provide the types of services and deliverables, which are listed in Annex 1 hereto ("Services/Terms of Reference"), as and when negotiated by UNDP headquarters or a UNDP country office and reflected in a contract for professional services, in the form attached hereto as Annex 2.
2. Such Services shall be at the discount prices listed in Annex 3. The prices shall remain in effect for a period of two years from Entry into Force of this Agreement.
3. UNDP does not warrant that any quantity of Services will be purchased during the term of this Agreement, which shall be for two years.

Article 2: CHANGES IN CONDITION

4. In the event of any advantageous technical changes and/or downward pricing of the Services during the duration of this Agreement, the Contractor shall notify UNDP immediately. UNDP shall consider the impact of any such event and may request an amendment to the Agreement.

Article 3: CONTRACTOR'S REPORTING

5. The Contractor will report semi-annually to UNDP on the Services provided to UNDP, including its country offices.

Article 4: GENERAL AND SPECIAL TERMS AND CONDITIONS

6. The standard UNDP General Conditions for Professional Services, attached as Annex 4, shall apply to this Agreement, and any subsequent contracts concluded in accordance with paragraph 1 above.

Article 5: ACCEPTANCE

7. This Agreement supersedes all prior oral or written agreements, if any, between the Parties and constitutes the entire agreement between the parties with respect to the provision of the Services hereunder.
8. This Agreement shall enter into force on the date of the last signature by the representatives of the Parties and shall remain in force for a period of two years, and may be extended for [one additional] year by mutual agreement of the Parties.

IN WITNESS WHEREOF, the duly authorized representative of the PARTIES have signed this agreement.

For and on behalf of:

UNITED NATIONS
DEVELOPMENT PROGRAMME

Date: _____

Date: _____

Annex I: General Conditions of Contract for Goods and Services (attached)