



## Testing and Consultancy for Operation of AC and DC Refrigerators

### Study on Native and Non-native Mode Operation of Off-Grid Appliances

Please refer to the [Overview](#) and [Terms of Reference](#) documents for this study.

#### REQUEST FOR PROPOSAL: RFP 01-19

#### Phase 1 - Comparative appliance testing. Testing and Consultancy for Study of Native and Non-native Mode Operation of AC and DC Refrigerators.

**Submittals can be for consultancy only or consultancy and testing.** Please indicate which category your submittal refers to. The final schedule of tests and costs will be agreed following award of contract. We also welcome joint proposals from consultants and test facilities that cover both options.

#### PROPOSAL FOR CONSULTANCY ONLY

As directed by EST, selected contractors for this work will be responsible for:

1. Providing consultancy to finalize the proposed test methods, appliance sample selection, inverter/rectifier selection, pre-testing and additional areas of analysis
2. Review of results
3. Taking part in consultative forum calls and meetings; at least 2 calls/meetings prior to testing, at least 2 calls/meetings during testing and final review/reporting call/meeting.
4. Contributing to project deliverables: final report, including a summary of lessons learned and recommendations from testing

The quotation for **consultancy only** must include the following elements:

1. A summary of qualifications and experience of the nominated person to be engaged in the assignment, relevant to the off-grid appliance sector and the operation of equipment in non-native modes.
2. A summary (<500 words) of the key issues relating to testing off-grid appliances outside of their native mode, with regard to efficiency, quality and cost. Responses should outline some of the most relevant aspects of refrigeration operation that might be affected by non-native mode operation.
3. Day rate for consultancy services.

#### PROPOSAL FOR CONSULTANCY AND TESTING

As directed by EST, selected contractors for this work will be responsible for:

1. Providing consultancy to finalize the proposed test methods
2. Taking part in consultative forum calls and meetings; (at least 2 meetings prior to testing, at least 2 meetings during testing and final review/reporting meeting).



3. Collaborating with EST to develop a standard test report template to document product testing results.
4. Coordinating with EST on the product shipping process, including providing any necessary assistance related to shipping, custom clearance, notifying EST of receipt of product(s), verifying model numbers of received product sample(s), packaging and reshipping after testing if necessary.
5. Inspecting the product sample(s) received; identifying and recording any external damage.
6. Performing tests on product sample(s) as defined in the final test method
7. As relevant, documenting and communicating to EST any difficulties with agreed test methods experienced during product testing. Where relevant and possible, suggesting improvements to the test method that would improve clarity, quality, and/or lower costs.
8. Working with the LEIA team to develop data analysis methods
9. Recording all test results in the test report template and provide brief, succinct descriptions of any relevant observations
10. Submitting test results to EST within five (5) business days of test completion.
11. Responding to any enquiries that EST may have about testing, including requests for periodic updates about the testing queue and any issues that may arise during testing.
12. Contributing to project deliverables: final report, including a summary of lessons learned and recommendations from testing

The quotation for **consultancy and testing** must include the following elements:

1. A summary of qualifications and experience of the nominated person to lead the assignment, relevant to the off-grid appliance sector and the operation of equipment in non-native modes.
2. A summary (<500 words) of the key issues relating to testing off-grid appliances outside of their native mode, with regard to efficiency, quality and cost. Responses should outline some of the most relevant aspects of refrigeration operation that might be affected by non-native mode operation.
3. Test laboratory profile, including any relevant accreditations and quality procedures, testing facilities and equipment, key personnel and expected roles and responsibilities, and a summary of qualifications relevant to this assignment:
  - Experience of conducting power measurements on both AC and DC power supplies (and the test methods used).
  - IEC 62552: Household refrigerating appliances – Characteristics and test methods (required)
  - WHO/PQS/E003/RF05-VP.4: Refrigerator or combined refrigerator and water-pack freezer: Solar direct drive without battery storage (preferred)
4. A summary of regional presence, especially in Africa and Asia, and related experiences of conducting testing for refrigerators or other off-grid products, including any experience in round robin testing.
5. Detailed cost estimate (in GBP) for testing by BOTH day rate and by individual test, as specified in the tables below.



### Quote by day rate

**Table 1**

Item	Day rate (GBP)
Use of testing facilities	
Consultancy	
Result collation/Reporting	

### Quote by individual test

Please provide an estimate of cost and estimated completion time by individual test by completing tables 2 and 3. The final test programme and costs will be agreed upon award of contract. The programme may include some of the below tests, or similar methods based on these. The Global LEAP Refrigerator Test Method can be found [here](#).

**Table 2 — AC refrigerators**

Description of Parameter/Test	Reference Test Method	Estimate for 1 sample		Estimate for 10 samples	
		Cost (GBP)	Testing time (hours)	Cost (GBP)	Testing time (hours)
Quality inspection	Global LEAP refrigerator test method				
32°C ambient					
Steady-state operation test, native mode	IEC 62552				
Steady-state operation test, DC supply with inverter					
Over/under voltage test, native mode	Global LEAP refrigerator test method				
Over/under voltage test, DC supply with inverter					
Testing of inverter efficiency	TBC				
43°C ambient					
Steady-state operation test, native mode	IEC 62552				
Steady-state operation test, DC supply with inverter					
Over/under voltage test, native mode	Global LEAP refrigerator test method				
Over/under voltage test, DC supply with inverter					
Testing of inverter efficiency	TBC				



**Table 3 –DC refrigerators**

Description of Parameter/Test	Reference Test Method	Estimate for 1 sample		Estimate for 10 samples	
		Cost (GBP)	Testing time (hours)	Cost (GBP)	Testing time (hours)
Quality inspection	Global LEAP refrigerator test method				
32°C ambient					
Steady-state operation test, native mode	IEC 62552				
Steady-state operation test, AC supply with rectifier					
Over/under voltage test, native mode	Global LEAP refrigerator test method				
Over/under voltage test, AC supply with rectifier					
Testing of rectifier efficiency	TBC				
43°C ambient					
Steady-state operation test, native mode	IEC 62552				
Steady-state operation test, AC supply with rectifier					
Over/under voltage test, native mode	Global LEAP refrigerator test method				
Over/under voltage test, AC supply with rectifier					
Testing of rectifier efficiency	TBC				

**SUBMITTAL**

Companies and organizations that wish to respond to this RFP must complete the [LEIA prequalification questionnaire](#). This is a requirement for all sub-recipients of UK DFID funding. Companies must also register as a LEIA Implementing Partner. Registration is easy, and must be completed via the [CLASP website](#) before final submittal.

Applicants are also required to submit one file with required information as listed below. The file should be named as per the following example: “Organization Name: RFP 01-19”.

The deadline for quotation submission is 5pm UK time on 8<sup>th</sup> February 2019. Proposals must be submitted online via the [CLASP website](#), filling out all the requested information. Late or incomplete quotations or quotations submitted directly to anyone at EST or CLASP will not be accepted.

All questions may be addressed to Stewart Muir at [stewart.muir@est.org.uk](mailto:stewart.muir@est.org.uk). The last date for submission of questions related to this RFP is 4<sup>th</sup> February 2019. We request that all enquiries be made by e-mail and not by phone.



## **INFORMATION FOR POTENTIAL APPLICANTS**

### Confidentiality Statement

All data and information received from test laboratories or other entities for the purpose of this assignment are to be treated confidentially and are only to be used in connection with the execution of this assignment. All intellectual property rights arising from the execution of this assignment are assigned to LEIA program donors and their designees. The contents of data sets or written materials obtained and used in this assignment may not be reused or disclosed to any third parties without the expressed advance written authorization of LEIA designees.

### **Standards relevant to testing products outside of native modes.**

This list is non-exhaustive.

- EN 50524 (Data Sheet and Name Plate for Photovoltaic Inverters)
- EN 50530 (Overall Efficiency of Photovoltaic Inverters)
- UL 1741 (Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources)
- IEC 61683 (Power conditioners – Procedure for measuring efficiency)
- IEC 62109-1 (Safety of Power Converters for Use in Photovoltaic Power Systems – Part 1: General Requirements)
- IEC 62109-2 (Safety of Power Converters for Use in Photovoltaic Power Systems – Part 2: Particular Requirements for Inverters)