

National Renewable Energy Laboratory  
Managed and Operated by the Alliance for Sustainable Energy, LLC  
Request for Quote (RFQ) No. 2023005373

**AMENDMENT NO. 1**

**“Acquisition of a New Cryo/Inert Transfer Gallium Focused Ion  
Beam (Ga-FIB) at  
National Renewable Energy Laboratory (NREL)”**

Amendment Issue Date:	2/3/2023
<b>Due Date for Proposals:</b>	<b><u>2/10/2023</u></b>
<b>Time Due:</b>	<b>5:00pm Mountain Time</b>

1. Solicitation Type                      Best Value Selection

*Submit offers to the NREL RFP Contact below*

2.            NREL RFP Contact      Janelle Gallegos, Subcontract Administrator  
National Renewable Energy Laboratory  
15013 Denver West Parkway  
Golden, CO 80401  
Email: Janelle.Gallegos@nrel.gov

**Amendment No. 1** Amendment No. 1 is hereby issued in response to questions received regarding the subject Request for Quote (RFQ). Please note that some questions may have been edited to address duplicate questions or to protect business-sensitive information provided in the original questions. The essences of the original questions are not affected. Questions are in no particular order.

**Regarding Attachment No. 1:**

- **I.3.c.** – Is 30 nm Ga resolution a typo? It seems very large for the technology and the SS document outlined this to be 5 nm. Does this need to be amended?
  - **A. This is a typo. Imaging resolution with Ga ion beam should be 5 nm or better.**

- **I.5.** – This specification only calls for “compatibility” with cryogenic stage, lifeout and transfer device. Do you need these items to be quoted, do you already have them, or will you purchase them separately?

If new systems are not to be proposed with the bid response, it is very important that the make and model of cryo-stage, cryo liftout and transfer device be provided before a configuration can be finalized. Please clarify how these items will be sourced.

- **A. The system should be compatible with both the Leica EM VCT500 cryo shuttle and Leica EM VCT500 cryo stage or equal devices capable of fulfilling the process described in the answer to I.5.d. These compatible components will not be purchased under this PO; there will be a separate procurement for those items.**
- **I.5.d.** - Please describe the desired sample workflow from glove box to FIB-SEM and any other tools.

Inert transfer to and from a glove box is not a problem. Is a transfer device that is cryogenically cooled required or will ambient temp/inert transfer be acceptable?

- **A. Cryogenically cooled sample transfer is required. The workflow from glove box or a plunge frozen sample to a cryo sputter coater, to the FIB-SEM, then transfer out of the FIB-SEM cryo stage will require the sample to remain at cryo temperatures for transfer into a cryo bath (without direct air/water exposure) for loading into the Cryo TEM holder or it will return to the glovebox.**
- **I.7.a.** - This spec mentions providing 16 vacuum compatible electrical feedthroughs. Is this all that is required? If feedthroughs with exact pin adapters for existing or future equipment are needed, more details on exact specification of the feedthrough needs to be provided. Please provide clarification.
  - **A. 16 vacuum compatible electrical feedthroughs is the minimum required. At this time, no existing equipment is planned for installation and specifics for future equipment are unknown. More vacuum compatible feedthroughs are welcome, but we will need a minimum of 16.**
- **I.7.b.** - This spec notes charge neutralization. Please clarify if charge neutralization for SEM imaging purposes or for during the milling process are required.

Please provide more details on the type of sample and conditions under which you need charge neutralization.

- **A. Charge neutralization is needed during the ion milling process to allow for simultaneous milling and imaging.**
- **II.c** – This spec requires an EDS system. The capabilities and price of any given EDS system range dramatically. Please provide more details on the SDD (e.g. min sensor size and resolution), as well as any specific software capabilities.

- *A. SDD minimum sensor size of 70 mm<sup>2</sup>; energy resolution of 130 eV or better; count rates >400,000 cps achievable; quantitative light element analysis and mapping (down to, and including, Li) is desired.*
- *II.h. and II.i. – Please clarify if you already have this equipment or if you have a specific make and model in mind? Please provide as much detail on this equipment as possible.*
  - *A. We do not already have this equipment, our future plans include investing in an SEM environmental cell and various sample mounts to enable easier FIB milling of samples at room temperature conditions.*

**Regarding pricing for extended warranty options (8a).**

- *Is it in the intention of NREL to purchase extended coverage at the time of purchase of the tool?*
  - *A: NREL would prefer the option of extended coverage if funding exists to add it to the order, but the main intent is to have the extended coverage pricing for planning purposes.*
- *If not, is NREL asking for fixed costs that could be exercised in the year coverage is delivered or is this simply estimated pricing for planning purposes?*
  - *A. If NREL cannot purchase the extended coverage, the estimate is for pricing for planning purposes.*
- *Is it correct to assume that offerors only need to quote for service costs for the Required Items? It would be difficult to provide clear values without knowing a final configuration.*
  - *A. Yes, the items under the extended service coverage should only include the required items.*