SOLICITATION FOR LETTERS OF INTEREST (LOI) NO. RCX-4-44440

"USA Trough: Near-Term Component/Subsystem Development"

READ THIS DOCUMENT CAREFULLY

This solicitation is being conducted under the streamlined procedures for competitive Letters of Interest established by the National Renewable Energy Laboratory (NREL). NREL will select a LOI for potential subcontract award based on the following:

- **All requirements being met**
- **The best combination of: Technical Factors (based on qualitative merit criteria,) Evaluated Cost, and Additional Factors for Evaluation**

Issue Date: 07/14/04 Due Date: 08/31/04 Time Due: 5:00 p.m. Mountain Time

Technical questions **must be received in writing** no later than 07/21/04 and can be sent via e-mail to laura_hughes@nrel.gov

1. SOLICITATION TYPE: Best Value Letters of Interest

Submit LOI responses to and request information from the NREL LOI Contact below:

2. NREL LOI CONTACT:

National Renewable Energy Laboratory
Attn: Laura K. Hughes, M/S 2713
Re: LOI No. RCX-4-44440
1617 Cole Boulevard
Golden, CO 80401-3393
Phone: (303) 384-7347
Fax: (303) 384-7310
E-mail: laura_hughes@nrel.gov

Electronic (PDF and Word) copies of forms and appendices can be found at:

http://www.nrel.gov/business_opportunities/related_docs.html

3. INTRODUCTION/BACKGROUND

In support of the Department of Energy's (DOE) Solar Program, the National Renewable Energy Laboratory (NREL), through its SunLab[1] collaboration, is interested in the development and ultimate commercialization of parabolic trough power plant technology. Based on the recent due-diligence analysis of parabolic trough technology sponsored by DOE (Sargent & Lundy 2002)[2], parabolic trough technology is viewed as an established technology with near-term market opportunities and has the potential for significant long-term cost reduction. Parabolic trough power plant projects are currently in various stages of development in Nevada, Arizona, Spain and Israel. If these projects and others in earlier stages of development move forward, the current suppliers of key parabolic trough components, such as mirrors and receivers, will not be able to keep up with demand.

The United States is uniquely positioned to play a key role in the future development of trough technologies as a result of the experience and expertise gained at the current Solar Electric Generation System (SEGS) plants. However, much of the development work on trough technology today is currently in progress outside the U.S. In 1999, in response to the promise seen in trough technology, the Solar Program developed the USA Trough Initiative. The USA Trough Initiative is intended to expand U.S. industry involvement and competitiveness in worldwide trough development activities and to help advance the state of parabolic trough technology from a U.S. knowledge base.

4. OBJECTIVES

The general objectives of the USA Trough Initiative are to:

- Advance the state-of-the-art of parabolic trough technology, integration, analysis, and services to improve the U.S. competitiveness of the technology. Specific activities will reduce cost, improve performance, improve reliability, reduce commercial risk, or affect other factors to improve the competitiveness of trough technology.

- Increase U.S. scope and/or supply of future near- and longer-term domestic and international trough projects (this includes all aspects of a project and not just hardware supply).

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[1] SunLab is a virtual laboratory collaboration that combines the Concentrating Solar Power (CSP) capabilities of the National Renewable Energy Laboratory (NREL) and Sandia National Laboratories. In SunLab the CSP work at both laboratories is managed as a single business unit, directed by a management team consisting of managers from both laboratories. Any resulting subcontract will be managed by NREL, but staff from Sandia may be involved in providing technical review of the subcontractors' work.

[2] Sargent & Lundy, "Assessment of Parabolic Trough and Power Tower Solar Technology Cost and Performance Forecasts," Draft 3, Prepared by the Department of Energy and National Renewable Energy Laboratory, SL-5641, October 2002.

The specific objectives of this solicitation in support of the USA Trough Initiative are described below.

This solicitation describes a project under the USA Trough Initiative and is concerned with cost-effective development of components or subsystems for parabolic trough solar thermal electric power production. Specifically, development of technologies for components or subsystems that may be applied to large (1 MWe solar and up) parabolic trough plants is the target.

The objective of the "USA Trough: Near-Term Component/Subsystems Development" solicitation is to advance U.S. based trough technology by encouraging the development of key parabolic trough components or subsystems that currently can only be obtained from a limited number of foreign companies.

5. SCOPE OF INTEREST

Following are some of the technical issues that responses to the LOI should address:

The scope of work details are expected to be developed by the Responder to meet the needs of their individual work effort, component/subsystem design, and limited-scale production and field validation to position the component/subsystem for intended markets.

The scope for this work effort is primarily technical in nature and should emphasize design for manufacturability and/or near-term supply of the key parabolic trough components or subsystems. For purposes of this solicitation, near-term refers to component/subsystem technologies that would likely be used in commercial applications in the next 1 to 5 years. The following is a list of key components and subsystems of interest to DOE/NREL's Solar Program for the purposes of this solicitation. While the components and subsystems listed below are high priority, they are meant only as suggestions for a project emphasis:

- Glass or alternative reflector panels
- Receiver tubes
- Collector structure
- Collector heat transfer fluid (HTF) interconnection (e.g. flexhoses, ball joint assemblies or alternatives)
- Drive systems
- Collector or field electronics or controls;

Technologies proposed under this scope of work must have been previously demonstrated in solar or similar applications such that the components or subsystems will be ready for parabolic trough application in the next 1 to 5 years. Project proposals focused on basic proof of fundamental science and technology concept(s) will be considered outside this scope of work and will not be eligible for evaluation. Successful

Responders will present proposals structured to meet the Qualification Requirements and Qualitative Merit Criteria, contained in Sections 6 and 9 respectively, below.

Component/Subsystem Technology Design Review and Characterization

Where design of a component or subsystem (of hardware, electronics or processes) is part of the proposed work effort, the Responder is strongly encouraged to include in the proposed work effort a comprehensive design review and design optimization procedure that can characterize the potential for the component or subsystem and position it for future demonstration. This can be affected by using a design review and optimization procedure such as Design For Manufacturing Assembly (DFMA) that breaks down a design into manageable subparts. These design subparts are then analyzed for all possible modifications aimed at more efficient and cost effective future production. The goal is to identify a more manufacturable and lower-cost integrated design that does not sacrifice overall cost effectiveness. To achieve this goal, where appropriate, the Responder is strongly encouraged to include the following in their proposed work effort:

- A strong rationale for the design/production issues the Responder has identified to investigate and how this rationale falls out of system considerations;
- A plan for evaluating the benefits of the process improvements (in terms of cost reductions or other improvements);
- Teaming with industrial expertise outside the existing solar community.

For proposed work efforts in which candidate component or subsystem technologies have already been selected, the Responder is strongly encouraged to include in the proposal a detailed description of the process employed to select that technology.

Limited Scale Production and Field Validation Data Collection

Where appropriate/possible, the Responder is strongly encouraged to include in their proposed work effort a plan for validating the selected component or subsystem technology through a limited-scale production run and, again where appropriate/possible, a plan for a subset of this production run to be installed for a field validation.

To the best of the ability of the Responder at this stage of the project plan (and assuming it is appropriate to the proposed work effort), the Responder must provide an estimate of the size of the limited-scale production run and the rationale for the size selected. Limiting the size of the production run is desirable to minimize the cost of the proposed work, but the proposed run should provide adequate information to accurately predict future cost and operating characteristics of the solar thermal component or subsystem.

Likewise, the proposed choice of a validation site, if any, and the proposed number of component/subsystems to be installed and tested should be justified by the need to confirm installation cost, performance, and reliability data. Operating the solar thermal component/subsystem at the site should provide any necessary data aimed at demonstrating reliability of the improved manufacturing design in a realistic operating environment. For this solicitation, the information obtained from such testing is intended primarily to improve the subcontractor's ability to warrant the component/subsystem thereby improving its future marketability. Any required testing should be clearly detailed in the proposal.

It is recommended that, where appropriate/possible, the proposed work effort include plans for performing a thorough evaluation to provide a clear understanding of the component/subsystem future production cost and the uncertainty in this cost for anticipated market production scenarios.

It should be noted that if the Responder is uncertain as to how to resolve specific challenges and/or difficulties in the proposed work effort; the Responder should give their approach for resolving these issues in as much detail as possible with a more realistic work plan being the ultimate goal.

The proposed project shall be broken down into tasks (and subtasks). The tasks may or may not be part of a multi-phased proposed project. A two-phased approach to the proposed project is encouraged if it fits the needs of the project. A possible, but not mandated, example of a two-phased project is as follows:

Phase I: Component/Subsystem Technology Design Characterization
Phase II: Limited Scale Production and Field Validation Data Collection

Each task shall be described in detail and have associated deliverable(s) which shall include:

- a project kick-off meeting at the start of the activity.
- activity review meetings scheduled to coincide with completion of major tasks and/or deliverables.
- Monthly Technical Progress Reports shall be prepared and submitted to NREL by the 15th day of each month. This report shall communicate an assessment of subcontract status, explain variances and problems, report accomplishment of performance milestones and discuss any other areas of achievement or concern.

Should the Responder be selected for negotiations, all other deliverables/reports will be structured to coincide with the Responder's proposed tasks to be negotiated between Responder and NREL.

6. QUALIFICATION REQUIREMENTS

Responder's demonstrated capability to fulfill the requirements of the project to include the following:

- Minimum of 20% Cost Share is required.

- Solicitation is limited to U.S. Businesses. For purposes of this request for LOIs, a U.S. Business is defined as a business incorporated or formed as a legal entity in the United States.

7. POTENTIAL SUBCONTRACT AWARD AND AVAILABLE PROJECT FUNDING

Funding for potential awards is based on availability of DOE funding and on programmatic considerations, as decided by DOE and NREL. Furthermore, NREL reserves the right to make multiple awards or not to make any awards under this solicitation.

NREL anticipates awarding **cost sharing type subcontract(s).** A sample cost sharing subcontract is posted with this LOI. Cost share means that a subcontractor or the lower-tier subcontractor shall share a percentage of the total subcontract or lower-tier subcontract price. No "in kind" cost share will be allowed. However, 100% of the cost of capital equipment can be used to satisfy cost share requirements. "In-kind" implies that a subcontractor already has the asset on hand, and it was not specifically or initially purchased for this project. Only costs incurred during the period of performance of a subcontract will be acceptable in meeting the cost share requirement, and the cost share cannot be funded by other Federal government sources.

There are no NREL funds for the purchase of equipment for U.S. businesses available under this LOI. However, the purchase of relevant equipment may be proposed as part of the U.S. business cost share.

The anticipated period of performance for any award is for a minimum of nine (9) months to a maximum of thirty-three (33) months. Subcontract(s) will be incrementally funded.

It is expected that the total program funding available under this LOI will be approximately $1.3 million. $300,000 is available from fiscal year 2004 funds and NREL *anticipates* an additional $1 million from fiscal year 2005 appropriations.

8. COMPETITIVELY SOLICITED LETTERS OF INTEREST USING BEST VALUE SELECTION

This LOI shall be conducted utilizing Best Value Selection that results in the selection of LOI's for potential subcontract award that is most advantageous to NREL based on the best value combination of (a) evaluated qualitative merit and (b) evaluated cost of the LOI's submitted.

Best Value Selection is based on the premise that, if all LOI's are of approximately equal qualitative merit, award will be made to the Responder of the LOI(s) with the lowest evaluated cost. However, NREL will consider selecting an LOI with a higher evaluated cost if the LOI demonstrates the difference in cost is commensurate with the higher qualitative merit. Conversely, NREL will consider selecting an LOI with a lower evaluated qualitative merit if the cost differential between it and other LOI's warrant doing so.

9. QUALITATIVE MERIT CRITERIA FOR BEST VALUE SELECTION

The Scope of Interest (see Item 5) and the Qualification Requirements (see Item 6) in this solicitation serve as NREL's baseline requirements that must be met by each letter of interest.

The qualitative merit criteria establish what NREL considers the technical factors valuable in an LOI. These qualitative merit criteria are performance-based and permit selection of the LOI's that provide higher qualitative merit for an increase in cost.

The following qualitative merit criteria will be used by evaluators to determine the technical value of the letter of interest in meeting the objectives of the solicitation.

Each qualitative merit criteria and its assigned weight are provided below:

<u>Capability & Qualifications (20%)</u>

1. Experience in renewable energy or research and development that can be applied to renewable energy systems.
2. Experience in planning and implementing renewable energy components or subsystems from design through turnkey operation.
3. Qualifications of proposed project staff and lower-tier subcontractors in relation to their responsibilities under the project.
4. Demonstrated track record for producing high-quality work on time and within budget supported by references and documented prior experience.

Project Concept (30%)

1. Proposed work efforts meet the objectives and scope of interest of this solicitation, see Sections 4 and 5.
2. The proposed work effort shall demonstrate the potential for an alternative supply of key parabolic trough components or subsystems for application at near-term parabolic trough plants.
3. The proposed work effort shall show potential for enhancing U.S. (or North American) components or subsystems future production capability to increase U.S. supply and improve the competitiveness of U.S. industry for near-term (next 1-5 years) domestic and international parabolic trough projects.
4. Special consideration will be given to work effort that supports the design for the development of components or subsystems that will have a competitive advantage (e.g. lower cost, improved performance) over existing component/subsystem supply. The LOI response must clearly characterize the future competitive advantage over existing supply options.

Technical Merit (20%)

The proposed project shall clearly demonstrate state-of-the-art application of design characterization and (if relevant to the work effort), limited-scale production, and field validation techniques. field validation. All projects must have sound scientific and engineering basis, design, and technique. Appropriate DFMA (Design for Manufacturing Assembly)-type process shall be proposed.

Potential Impact (30%)

1. The proposed work effort must convey a commitment to the future commercialization of the component or subsystem technology under development. This could include a description of how the Responder sees their component/subsystem fitting into a parabolic trough system, how they see the future market for that component or subsystem developing, how they plan to exploit this market in the future, present or planned partnering, etc. A preliminary business plan provided as an appendix to the proposal would best document the Responder's commitment to future commercialization. Although preliminary in nature, the business plan should be sufficiently comprehensive in scope to demonstrate the Responder's commitment to future commercialization. To the extent appropriate/possible at this stage of component or subsystem development, the plan should project the production levels consistent with expected near-term markets and the fraction of the market the Responder expect to capture. Responders should provide the rationale for their market and production scenarios as part of their proposals.

2. Within the DOE Solar Program there are several ongoing USA Trough Initiative efforts. The goals of these projects are development and

commercialization of various parabolic trough solar thermal power technologies. In order to eliminate duplication, Responders, especially those involved with the projects listed above, must provide a sufficiently detailed explanation of how the work proposed under this Letter of Interest is exclusive of or complementary to the ongoing projects.

10. COST EVALUATION FOR BEST VALUE SELECTION

After evaluation of the qualitative merit criteria and additional factors for evaluation, the following cost evaluation will be used to determine the best value of the LOI in meeting the objectives of the solicitation. Note that the combined qualitative merit value will be considered substantially more important than the cost.

A. Responder's demonstrated understanding of the project based on the cost estimated to perform the work.

B. Responder's demonstrated understanding of the risk involved based on the estimated cost proposed.

C. Reasonableness of the total estimated cost and the individual cost elements that comprise the total estimated cost.

D. Reasonableness of the estimated cost proposed in relation to the magnitude and significance of the work to be performed.

E. Responder's level of cost sharing.

11. ADDITIONAL FACTORS FOR EVALUATION

In addition to the qualitative merit and cost criteria listed above, each proposal will be evaluated using the following evaluation factor to determine the competitive range and final negotiation rank order. This factor is not weighted:

- The object of technological diversity among the projects selected.

12. EVALUATION PROCESS

NREL will evaluate LOI's in two general steps:

Step One – Initial Evaluation

An initial evaluation will be performed to determine if all information has been provided for an acceptable LOI. Responders may be contacted only for clarification purposes during the initial evaluation. Responders shall be notified if their LOI is determined not

acceptable and the reasons for rejection will be provided. Unacceptable LOI's will be excluded from further consideration.

Step Two –Discussion and Selection

All acceptable LOI's will be evaluated against the scope of interest and the qualification requirements; the qualitative merit criteria, the additional factors and cost evaluation listed above. Responders selected through the best value selection process will be contacted with the intent to negotiate the technical requirements of an acceptable Statement of Work, based on the Responder's LOI. Subsequently, NREL will issue a Request for Proposal (RFP) to confirm the technical requirements and finalize a cost proposal based on this developed Statement of Work.

13. LOI PREPARATION INFORMATION

A. Formatting instructions:

1) A page is defined as one side of an 8 ½" x 11" sheet of paper.
2) Use a 12-point font.
3) Maintain at least 1-inch margins on all sides.
4) Copies may be either single or double sided.

B. Submit no more than the maximum number of pages as detailed under Item F, below.

C. Submit a "**Letter of Interest**" in an original and four (4) copies directed toward meeting the requirements of the solicitation. The LOI shall be organized in the following sections:

1) A title page, to include the Request for LOI title and number, proposed project title, name of organization, and principal investigator (with postal address, telephone number, fax number, and e-mail address). The project title shall be succinct and capture the essence of your LOI.

2) A technical discussion limited to a maximum of twelve (12) typed pages (single-spaced) supporting the proposed work. Elements to be addressed shall include:

-A one (1) -page overview of the proposed project.

-A technical discussion in support of research approaches.

-A discussion of potential technical difficulties and proposed solutions.

3) A concise Statement of Work, limited to five (5) pages, delineating the proposed tasks to be performed during the performance period. This Statement of Work would form the basis for the Statement of Work in a potential subcontract.

4) Statement of expected results, including a detailed breakdown of targeted milestones and deliverables for each phase if applicable, and a proposed schedule for these by phase, limited to two (2) pages.

5) Description of facilities available to perform the proposed research. Facilities-related environment, health and safety issues must be addressed, if only to clarify existing strategies.

6) A selected list and brief description of contracts or subcontracts related to the field covered by this LOI that the Responder has been awarded in the past five (5) years, to include the contracting agency's name, the contract or subcontract amount, a contact name and telephone number, and a brief description of the project. NREL may contact the contracting agencies.

7) Abbreviated resumes (one page maximum) of one (1)-or two (2) key personnel.

D. Submit a completed **Estimated Budget Form** in an original and four (4) copies. The Estimated Budget should include totals for each phase and the total of all phases. Profit or fee is not allowed for this solicitation. The estimated budget and delivery terms must be valid for 180 days from the date of the LOI response.

E. In addition, LOI responses must include one (1) original (no copies necessary) of the following:

1) Completed "Representations and Certifications".
2) Acknowledgments of all amendments to this solicitation. Amendments will be posted on this web site.

F. **The total LOI response, including any attachments or appendices, is limited to twenty five (25) pages (not counting Representations and Certifications, Amendment Acknowledgments, and Estimated Budget Form).** Relevant references may be cited, but do not include copies of referenced articles in the submission. LOI responses may identify no more than ten (10) selected publications of the principal investigator(s).

G. This solicitation DOES NOT allow for the submittal of facsimile or electronic LOI responses.

H. This solicitation does not commit NREL to pay costs incurred in the preparation and submission of a response to this request for LOI.

14. SOLICITATION PROVISIONS

A. Late submissions, modifications, and withdrawals of LOI's

LOI's, or modifications to them, received from qualified organizations after the latest date specified for receipt may be considered if received prior to selection, and NREL determines that there is a potential budget, technical, or other advantage, as compared to the other LOI's received. However, depending on the circumstances surrounding the late submission, NREL may consider a late LOI to be an indication of the respondent's performance capabilities, resulting in downgrading of the LOI by NREL evaluators in the technical evaluation process. A LOI may be withdrawn by written notice or telegram (including mailgram) received at any time before selection. A LOI may be withdrawn in person by a Responder or an authorized representative, if the representative's identity is made known and the representative signs a receipt for the LOI before selection.

B. Restrictions on disclosure and use of data

Responders, who include in their LOI's data that they do not want disclosed to the public for any purpose or used by the government or NREL, except for evaluation purposes, shall –

1) Mark the title page with the following legend:

"This LOI response includes data that shall not be disclosed outside the Government or NREL and shall not be duplicated, used, or disclosed--in whole or in part-- for any purpose other than to evaluate this LOI. If, however, a subcontract is awarded to this Responder as a result of--or in connection with--the submission of this data, the government or NREL shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting subcontract. This restriction does not limit the government or NREL's right to use information contained in this data if obtained from another source without restriction. The data subject to this restriction are contained on pages [*insert page and line numbers or other identification of pages*]"; and

2) Mark each page of data it wishes to restrict with the following legend:

"Use or disclosure of data contained on this page is subject to the restriction on the title page of this LOI."

C. **Notice of right to receive patent waiver (derived from DEAR 952.227-84) and technical data requirements.**

Responders (and their prospective lower-tier subcontractors) in accordance with applicable statutes and Department of Energy Acquisition Regulations, (derived from DEAR 952.227-84) have the right to request a waiver of all or any part of the rights of the United States in inventions conceived or first actually reduced to practice in performance of the subcontract that may be awarded as a result of this solicitation, in advance of or within thirty (30) days after the effective date of subcontracting. Even where such advance waiver is not requested or the request is denied, the subcontractor will have a continuing right during the subcontract to request a waiver of the rights of the United States in identified, individual inventions.

Domestic small business firms, educational institutions, and domestic nonprofit organizations normally will receive the Patent rights clause—retention by the subcontractor—which permits the Responder to retain title to subject inventions, except in subcontracts involving exceptional circumstances or intelligence activities. Therefore, domestic small business firms, educational institutions, and domestic nonprofit organizations normally need not request a waiver.

If a Responder's LOI response includes a lower-tier subcontract to another organization, that lower-tier organization's business type will determine the applicable intellectual property provisions that will apply to the lower-tier subcontract. Note that a lower-tier subcontractor may apply for a patent waiver under the same conditions as the Responder.

Under a research, development, and demonstration project, the Department of Energy and NREL are unable to ascertain, prior to receipt of LOI's, subsequent proposals, or performance of the project, their actual needs for technical data. It is believed that the requirements contained herein are the basic needs of the Department of Energy and NREL. However, if the Responder indicates in its LOI or subsequent proposal that proprietary data will be used or withheld under its proposed effort, the government and NREL reserve the right to negotiate appropriate rights to the proprietary data. The appropriate rights may include "Limited Rights in Proprietary Data" and/or "Subcontractor Licensing."

D. **Disclaimer**

NEITHER THE UNITED STATES, NOR THE DEPARTMENT OF ENERGY, NOR MIDWEST RESEARCH INSTITUTE, NATIONAL RENEWABLE ENERGY LABORATORY DIVISION, NOR ANY OF THEIR CONTRACTORS, SUBCONTRACTORS, OR THEIR EMPLOYEES MAKE ANY WARRANTY, EXPRESSED OR IMPLIED, OR ASSUME ANY LEGAL LIABILITY OR RESPONSIBILITY FOR THE ACCURACY, COMPLETENESS, OR

USEFULNESS FOR ANY PURPOSE OF ANY OF THE TECHNICAL INFORMATION OR DATA ATTACHED OR OTHERWISE PROVIDED HEREIN AS REFERENCE MATERIAL.

E. **Solicitation Disputes**

The General Accounting Office and the Department of Energy do not accept or rule on protests for solicitations for Letters of Interest issued by Management and Operating Contractors for the Department of Energy (operators of Department of Energy National Laboratories). Should a Responder have any concerns regarding the NREL solicitation process or selection determination, the Responder may contact Marty Noland, Advocate for Commercial Practices at (303) 384-7550. NREL will address each concern received from a Responder on an individual basis.

15. SOLICITATION PROVISIONS – incorporated by reference – general access

This solicitation incorporates one or more solicitation provisions by reference with the same force and effect as if they were given in full text. The following documents can be downloaded from the NREL general access website at:

http://www.nrel.gov/business_opportunities/related_docs.html

A. NREL Representations and Certifications for Subcontracts

B. NREL Estimated Budget Form

C. NREL Standard and Intellectual Property Terms and Conditions

16. NAICS CODE AND SMALL BUSINESS SIZE STANDARD

A. The North American Industry Classification System (NAICS) code(s) [formerly standard industrial classification (SIC)] for this solicitation is 54171.

B. The small business size standard for 54171 is 500 or less employees.