NATIONAL OILHEAT RESEARCH ALLIANCE

LFR CENTER
Liquid Fuels Research Center

Product Development
Program Opportunity Notice (PON) No. 2014-001
October 31, 2014

$2,000,000 Available in this Round of Funding
Proposals are due December 12, 2014 at 5:00 PM Eastern Time

The National Oilheat Research Alliance Board of Directors in its budgets for 2014 and 2015 has authorized $2,000,000 to be spent on the following project areas. Successful research, development and demonstrations grants in the past ranged from $20,000 to $350,000. All projects will be managed by NORA's Liquid Fuels Research Center (LFRC).

NORA PON No. 2014-001 seeks proposals to support the development, demonstration, and commercialization of Oilheat technologies and systems in the following categories:

Category A: Fuel use/tracking
Category B: Combustion monitoring
Category C: Fuel Quality Assessment
Category D: B-100 burner
Category E: Remote Analysis Technologies
Category F: Atomization technology
Category G: Tankless Coil Boilers with High Annual Efficiency
Category H: Field Experience with High Biodiesel Blend Levels
Category I: Other New Ideas

Under PON No. 2014-001, NORA plans to award multiple cost-shared contracts in Categories A through I up to a total of *$350*,000 for each award. This funding allocation may be adjusted depending on the quantity and quality of proposals received. There is no minimum project funding amount per project award.

This solicitation includes the following:

A conference call will be held on November 18, 2014 at 2 PM EST. There will be a short discussion on the basic elements of the PON and then NORA will entertain any questions from the participants.

Dial in number: 716.274.3400
Meeting ID: 1279264#

Proposers are strongly encouraged to contact NORA to discuss their planned proposals after the above conference call and prior to submission if questions remain unanswered. If you have any questions about program issues or the technical scope of this solicitation, please contact one of the following individuals by e-mail, facsimile or calling:

To:	Richard Sweetser; Director R&D	cc:	John Huber; President
	Phone: 703.707.0293	Phone:	703.340.1660
	Fax: 703.707.9566	Fax:	703.340.1661
	E-mail: rsweetser@noraweb.org	E-mail:	jhuber@noraweb.org

Proposals must be sent by email in a PDF to jhuber@noraweb.org or posted on a secure website for download by NORA. Late proposals, and proposals lacking the appropriate completed and signed Proposal Checklist, will be returned. Proposals will not be accepted at any other location, other than that specified above. If changes are made to this solicitation, notification will be posted on NORA's web site at www.noraweb.org

Applications will be evaluated by NORA's research and development committee and outside technical/financial experts, with funding decisions expected approximately six weeks after the proposal due date. The review will involve a comparative evaluation of the criteria in Appendix C.

Background:
The Oilheat/Bioheat industry came together, on June 3 and 4, 2014, to lay the foundation for the next

five years of RD&D. Fifty-eight industry experts1 were invited to Brookhaven National Laboratory. These individuals included senior engineers, research scientists, oilheat professionals, and managers of retail and wholesale oil companies.

The home heating/energy market is undergoing yet another revolution. Fuels are changing, new government policies are rewriting the rules, and customers are expecting more from their home energy systems and suppliers. The industry believes that the move to Bioheat and a robust RD&D program over the next five years is essential to help secure the industry‘s customer base and further position the industry as an integral part of America’s sustainable and resilient energy future.

At the Brookhaven workshop, the research accomplished to date at by NORA was reviewed. Additionally, the groups assessed industry needs, developed and prioritized topic areas for RD&D, and developed and prioritized an initial RD&D project list and approved a framework for ongoing RD&D program management. The Summit participants also reviewed NORA’s RD&D management framework for the next five years.

Table 1 presents the prioritized research topics forthcoming form this meeting of subject matter experts.

[1] Oilheat dealers, wholesalers, equipment manufacturers, DOE, NYSERDA, biodiesel suppliers, biodiesel blenders, academia, and trade media

Table 1: Research Prioritization

Research Topic	Votes	Priority % In Topic	Priority % of Total
Develop Powerful Fuel Use Tracking/Savings Tools…simple to use with wide adoption goal	17	50%	8%
Combustion Monitoring	16	41%	7%
Quick Low Cost Method to Assess Fuel Quality (including % Bio)	14	50%	6%
B-100 Burner	14	33%	6%
FSA Calculator/NORA Stamp of Approval/IBR-Like Testing	12	38%	6%
Develop virtual "Smart Meter" Technology for Instant Results & More Efficient Deliveries	12	35%	6%
Novel Atomization Technical Feasibility	11	26%	5%
Technical/Climate Change Info to State Energy Offices/Stakeholders	10	25%	5%
Address the Myths with: Technical Data Sheets/Handouts to: Real Estate Community, AHJs (Authority Having Jurisdiction: Fire Marshals, Inspectors, etc.), Insurance Companies, Customers, Blenders, Students, Environmental Groups (NRDC, Sierra Club)	10	25%	5%
Modulating Burners	9	21%	4%
Best Practices Manual - Q.C. Programs, Housekeeping - Water/Contamination, I.D. Characteristics	8	29%	4%
Technical Work for Higher ASTM Spec than 20%	8	20%	4%
Sensors/Diagnostic Tools	8	19%	4%
Self-Powered Systems	7	18%	3%
Emerging Issues Assessment Lubricity, Corrosion, ULSHO, etc.	6	21%	3%
Use High Production Gas Designed Heat Exchangers	6	19%	3%
Common Language	6	15%	3%
NORA Advanced Tech. Monitoring	6	15%	3%
Cloud Point/Coldflow Info and Specs	6	15%	3%
Make FSA More Useful	5	15%	2%
Tankless Coil Cost Analysis Options to Improve Efficiency	4	13%	2%
Self-Learning Systems	4	10%	2%
Target 50% by 2030, 100% by 2050	4	10%	2%
Flue Gas Dilution Venting System for Near or Fully-Condensing Equipment	3	9%	1%
Oil-fired Whole House Generator	3	9%	1%
Retrofit Options: e.g. flue gas economizer, controls, etc.	2	6%	1%
Extended Service Times	1	3%	0%
Low Cost System Components	1	3%	0%
Strategic Partnerships to Develop More Oils/Fats - New Sources	1	3%	0%
Scientifically Capture Field Data over B20	1	3%	0%
CFD	1	2%	0%
Permitting for B100 Tanks/Less Spill Impacts	0	0%	0%
Low Cost Near-Condensing Boilers	0	0%	0%
Listing Barriers	0	0%	0%
ULS Specific Heat Exchangers	0	0%	0%
Response to Modulation	0	0%	0%
Validating Retrofit Options	0	0%	0%
Printed Heads	0	0%	0%

I. PROGRAM INTEREST AREAS

Category A: Fuel use/tracking

Background:

Measurement and analysis tools for improved fuel use monitoring are sought. Fuel use monitoring is useful in optimizing delivery planning, analysis of the impacts of equipment upgrades and other energy efficiency measures, and identifying potential fuel leak conditions. Products to be developed may include accurate fuel tank level sensors, run-time monitors, intelligent thermostats/aquastats or other sensor devices or software products to analyze fuel use, provide K-factors, and signal delivery needs.

In prior development efforts, concepts have been developed which monitored run time remotely. Products have also been developed which measure pressure in the fuel supply line in a one-pipe system. Pressure during burner off periods provided information on fuel tank level[2].

Category A projects may address:

Products which can be installed in a home and provide real time information on fuel use via phone or internet connection. Such products could be installed temporarily for use in an energy efficiency study or could be an integrated part of a larger heating system monitoring concept. Software tools which provide fuel use analysis are also of interest and this may be on-line tools or programs. Unique sensor concepts for determining fuel level or use are of interest. Monitors which provide alarm signals when tank levels are low appear to be well developed, and are unlikely to receive funding.

Category B: Combustion monitoring

Background:

With increased interest in low cost tools for enhanced efficiency of service operations, improved sensor concepts are sought which can provide diagnostics on oil burner conditions. Such information can be used to indicate burner systems which are likely to require service in the near future. This information can also be used to indicate the likely nature of a burner fault, leading to pre-planning of repair services needed. Measurements may be used locally or as part of an on-line service management system.

In prior efforts, flame optical diagnostics, burner power draw, optical flue gas smoke number measurements, in-stack CO and oxygen monitoring, and ignition delay have been explored for combustion monitoring.

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[2] Henderson, H., Dentz, J. and Doty, C., Verifying a Simplified Fuel Oil Field Measurement Protocol, U.S. DOE Building America Program report, July, 2013

Category B projects may address:
The development of unique measurement concepts for oil burner combustion monitoring. Projects do not need to address ways that the measurements can be used (communication or display links) but rather are expected to focus on the development of very cost effective sensor and diagnostic concepts.

Category C: Fuel Quality Assessment
Background:
Fuel quality-related issues have long been the most important part of oil-fired heating system service requirements. Fuel marketers, at the retail level, have limited measurement tools available to rapidly identify the quality of the fuel they are delivering. A range of instrument options, including portable Fourier transform infrared spectroscopy (FTIR) analyzers, are commercially available (e.g. www.compass-instruments.com) but not commonly used in the heating oil market. Instrument cost and typical retail marketer company size are factors which affect this. Lower cost, monitoring tools for contamination levels have also been offered in the past.

Category C projects may address:
Novel fuel quality evaluation products. Projects may also address the development of fuel quality evaluation programs which may include a combination of rapid on-site evaluation tools, "shared" local instrumentation arrangements, and rapid-response laboratory evaluation. Part of any project may include laboratory validation of field fuel quality measurement tools.

Category D: B-100 burner
Background:
The heating oil industry has a strong interest in enabling the use of biodiesel. Currently, B-5 (5% blends of biodiesel in heating oil) are formally accepted as equivalent to heating oil. Some marketers are using B-20 blends across their entire customer base. Some other marketers are using, on a limited basis, biodiesel blends up to B-100. The burners currently in widespread use are not approved under UL standards for biodiesel blends beyond the standard 5%. The goal of this category is to eliminate the burner limitation as a barrier to widespread use of higher biodiesel blends by supporting the development and commercialization of a burner listed to use any blend level up to B-100. ASTM D6751 defines the biodiesel which would be used in any fuel blend and is expected to be the basis for the listing approval.

Category D projects may address:
The development and commercialization of a home oil burner, fully approved for use with biodiesel blends up to B-100. The burner should be developed as a replacement for the current generation of oil burners and so, is expected to have a fixed firing rate and meet the same performance parameters and reliability level as current systems. Use of components very similar to those in

current burners is expected to improve market acceptance but is not mandatory. Pump dry lift, time-to-prime, resistance to vent system transient and steady state backpressure, and startup smoke emissions should be considered. Burner cost, industry engagement, and commercialization plan should be addressed in the proposal. Advanced features such as modulation or two stage firing are not required, but a burner that is full service and can meet a variety of needs will be considered advantageous.

Category E: Remote Analysis Technologies

Background:

There is broad interest in technologies for remote monitoring, diagnostics, and control of heating systems. This includes communicating thermostats, burner primary controls, and aquastats along with potentially other home systems such as air conditioning and alarms. These systems can provide on-line customer service management, delivery optimization, optimize space heat and domestic hot water temperature settings to enhance efficiency, implement on-line outdoor reset incorporating weather forecasts, enable right-sizing of future systems more efficiently and accurately than a heat loss exercise, enable continuous deployment of advanced algorithms, and implement demand side management for cooling systems. This is a field which is evolving rapidly but which needs demonstrated and documented energy savings information to enhance acceptance.

Category E projects may address:

Field demonstration of concepts for remote monitoring, diagnostics, and control of heating systems. The projects may include a limited amount of product development but are expected to focus on demonstration of existing platforms and documentation of performance and energy saving potential. A key part of these products is expected to be the web interface and it is expected that service organizations (one or more) will be engaged in this project to provide feedback on utility and market potential.

Category F: Atomization technology

Background:

Current oil burners use simplex swirl atomizers operating at fuel pressures ranging from 100 psi to 150 psi. These atomizers have a long history of reliable operation and low cost with a fixed firing rate. The most common oil burner firing rate is in the range of 0.65 to 0.85 gallons per hour. In newer, low heat loss homes lower firing rates are needed to meet the peak space heat demand ~ 0.1 to 0.4 gallons per hour. Lower firing rates would also enable new product concepts such as room space heaters. Recently, manufacturers of simplex nozzles have offered new products with firing rates as low as 0.25 gph. Traditionally there has been concern about plugging and blockage with such small nozzles. A recent study at BNL has shown such small nozzles to operate reliably if high thermal stress following burner shut-down is avoided.

The overall goal of this category is to enable exploration of new concepts which provide both low firing rates and modulation with reasonable product cost. Atomization quality meeting or exceeding the performance of current simplex swirl atomizers is expected. Many atomization technologies have been explored including two-pressure pumps, modulation with pulsed fuel delivery, air atomization, spinning head, and vaporization/air premixing concepts. It is recognized that novel atomization concepts are key to enabling future oil burner products.

Category F projects may address:
Under this category, novel atomization / fuel preparation concepts can be proposed for further evaluation as a step prior to burner development. The focus should be on evaluation of system cost and power consumption requirements. The construction of atomizer prototypes and drop size distribution measurements should be included. Under this category, integration with burners for commercialization is not required. If an atomization concept, based on the work completed under this category, is shown to have strong potential, a follow-on project which may include a burner manufacturer, is expected. As appropriate proposals may include limited combustion demonstrations. Atomization concepts which are already developed and considered "ready" for burner integration and commercialization are not invited under this category. Future NORA PON's are expected to call for advanced, integrated burner development.

Category G: Tankless Coil Boilers with High Annual Efficiency
Background:
Tankless coil boilers have long been a dominant product offering. These systems have the advantages of relatively low cost, good performance during the heating season, and small space requirements. The major drawback of tankless coil boilers has been high fuel use during non-heating seasons due to a need to maintain the boiler at high temperature to meet expected domestic hot water loads essentially instantly. With tank type water heaters (direct or indirect) setpoints are typically in the 130 F range. In tankless coil boilers, during the non-heating seasons, it is not uncommon for the boiler temperature to be maintained in the 170-200 F range to deliver consistent domestic hot water at just 130. Factors which contribute to this high temperature include heat exchanger coil size, coil fouling over time, and non-uniform distribution of temperature within the boiler (local cold sections). High boiler temperature leads to very high off-cycle losses. In some incentive programs, tankless coil boilers have been explicitly excluded.

Having a low cost, high annual efficiency tankless coil boiler product could create a retrofit market as well as new customer options.

Recently, BNL has been involved with field tests of a new commercial control concept which maintains a tankless coil boiler at a low temperature until there is a demand period. Approaches

like this could dramatically reduce idle losses. Beyond controls, other concepts which could contribute to high annual efficiency in a tankless coil boiler include: larger coils, better boiler jacket insulation, high combustion efficiency, flue dampers, forced boiler water recirculation during hot water draws, and integration of an external plate type heat exchanger to allow lower setpoints.

Category G projects may address:
Development of a low cost tankless coil product, which seeks to achieve low idle losses and high annual efficiency, while meeting domestic hot water demand expectations of the market. The product should be sized for potential retrofit to existing homes. Field evaluation of refit tankless coil boiler controls may also be addressed. To gain market acceptance, clear documentation of the performance of this system will be needed.

Category H: Field Experience with High Biodiesel Blend Levels
Background:
As noted in the discussion of Category D, above, the industry has a strong interest in the increased use of biodiesel blends. Currently, some marketers are using blends with biodiesel content ranging from 20 to 100%. This experience base provides a valuable resource from which future design and operation guidance can be obtained. Some information on experience with higher blends in this area has been obtained in a pilot project currently in progress sponsored by NYSERDA, the National Biodiesel Board, and NORA.

Category H projects may address:
Field studies to capture experience with long term (three years or greater) experience with biodiesel blends above 25%. This may include fuel tank sampling, equipment inspection, review of service records, monitoring, surveys and structured interviews with service personnel.

Category I: Other New Ideas
Background:
NORA encourages new ideas. Category G is designed to capture new ideas, products and advanced diagnostics not previously identified in Categories A-F above. Some ideas for consideration include low electric power heating systems with battery backup, microCHP concepts, novel end use appliances based on liquid fuels, novel renewables integration concepts, and new emerging biofuels. Areas that have been excluded above may be submitted under this category.

II. PROGRAM REQUIREMENTS, PROPOSAL FORMAT, PROPOSAL EVALUATION

Project Scope – Proposals must:

- In all cases, proposals must articulate how the proposed work will markedly benefit the industry within the next five years.
- Provide quantifiable energy, environmental, economic, industry and/or consumer benefits.
- Emphasize development of marketable products with market introduction dates within three years.
- Provide a summary discussion of the commercialization path appropriate to the stage of development of the proposed technology. Note that, even in early stage projects, initial projections of commercialization (or technology deployment) paths and challenges are essential to assessing *benefits, risks, and future resource requirements.*
- *Provide cost-sharing by the proposer or third parties:*
    - *In the form of cash or in-kind labor, materials, equipment, facilities, and other resources, subject to reasonable and verifiable valuation. Cost-sharing may be from the proposer* or other private or government sources. NORA's funds cannot be used to reimburse or replace normal expenses of other government organizations.
    - Equal to at least 20% of the total project cost. The quality of the proposer's cost-sharing will be examined during the proposal evaluation process. Cash, labor, and materials are considered superior to other types of cost-sharing. The type of cost-sharing offered should be appropriate for the proposer's financial condition and the stage of development of the product/process, i.e, degree of risk. The level of cost-sharing will be considered an indicator of the proposer's commitment to the success of the project.

Project Schedule, Phasing and Teaming – The following guidelines should be considered when developing proposals:

- Projects are expected to begin within three months of the proposal due date. The project schedule, including future phases (beyond the proposed phase) of a multiphase project, should not exceed 36 months.
- Requirements for Multiphase Projects – Multiphase projects are acceptable as long as the proposal:
    - Briefly describes all phases along with significant milestones, and provides an estimate of the total cost and schedule for all phases.
    - Proposers shall only request funding for one clearly-defined phase that adheres to the funding limit as described above. The proposer must accept that any contract awarded to fund one phase of a multiphase project does not in any way obligate NORa to fund later phases. Funding requests for additional phases may need to be submitted under a future PON for competitive evaluation.
- Teaming arrangements are encouraged, where appropriate, to enhance the likelihood of

project success. Teams may include commercial firms, industry associations or research organizations, universities, government agencies, end-users, and other stakeholders. Include letters of interest or commitment from each identified team member in an appendix to the proposal.

Other Requirements:

- A proposal may be considered non-responsive if it fails to comply with the requirements above, the Proposal Format (below), or the General Conditions of Section III.
- Prior to an award being made, potential contractors may be required to demonstrate: access to financial resources sufficient to perform the proposed work; technical experience and adequate facilities (or the ability to access them); a good performance record and; the ability to qualify for an award under applicable laws and regulations.

Proposal Format:

Total proposal length should be 16 pages or less, plus letters of interest or commitment in an appendix. The contract pricing proposal or budget is not included in this page limit. Suggested page limits for each section are provided below in parentheses. Proposals that exceed the page limits may be rejected as non-responsive.

Proposals must be sent by email in a PDF to jhuber@noraweb.org or posted on a secure website for download by NORA.

Each proposal must include the items listed below and should present the items in the sequence indicated.

A. Proposal Checklist – Complete and sign the specific Proposal Checklist attached as part of this PON, and include it as the front cover of the original and each copy of the proposal.

Note the following:

- Indicate whether you accept the standard terms and conditions as contained in the attached Sample Agreement. If you do not accept the standard terms and conditions, provide alternate terms with justification based on the risk and benefit to NORA.
- Be sure the individual signing the Proposal Checklist is authorized to commit the proposer's organization to the proposal as submitted.

B. Proposal Sections – Sections of your proposal should be as follows:

1. **Executive Summary** (one page) – Briefly summarize your proposal, emphasizing:
   - The problem or opportunity being addressed, and its significance, and its relevance to this

PON.

- Your proposed solution and how it will solve the problem or exploit the opportunity.
- A list of the project team members and their qualifications to do the work.
- Benefits if the project is successful. Include an estimate of market potential and quantify the energy, environmental, and economic benefits to the extent possible.
- User economics. Provide an estimate of the price of the product, process or service that eventually will be commercialized and the price(s) of relevant alternative products or services. Briefly explain the customer's economic motivation for buying the new product, process or service, versus alternatives.

2. **Problem Statement and Proposed Solution** (two pages) – Describe:
   - The problem or opportunity being addressed, and its significance, and its relevance to this PON.
   - Your proposed solution and how it addresses the problem or opportunity, its technical basis, innovative characteristics, and current stage of research and development.
   - Economic and performance comparisons to competing technologies.
   - If this proposal addresses a subsequent phase of a previously funded NORA project, the results of the earlier phase(s) and current project status.

3. **Proposed Work Scope and Schedule** (three to four pages) – Provide:
   - Technical or performance goals for proposed product, process or system.
   - A list of major tasks to be accomplished and a three- or four-sentence description of each. Typical task titles may include, but are not limited to, the following: project management and reporting, requirements definition, preliminary design, fabrication, testing, final design, and demonstration. (Note: NORA will expect to receive written progress reports and a final report, and have occasional project meetings, as part of the project management task. These activities should be considered when developing your cost estimates.)
   - The duration of the project and timing of major milestones, such as design reviews, test result reviews, completion of working prototypes, and the start of metrics reporting to NORA, showing progress toward project objectives and goals.
   - If applicable, a brief description of additional phases, beyond the proposed work, that will be necessary to fully achieve commercialization, and their anticipated duration.

4. **Proposer Qualifications** (two to four pages)
   - Proposer and any other team members and major subcontractors. Provide a chart showing the relationship between team members.
   - Project Manager and other key individuals.
   - Qualifications of all organizations and individuals named above, including relevant experience and references.

- NORA contracts awarded to the proposer, if any, in the past five years.

5. Project Benefits (two pages) – Outline benefits as follows:

- **Quantify** the following direct benefits to the extent possible:
  - Energy benefits (e.g.: fuel economy impacts versus alternate technologies);
  - Environmental benefits (e.g.: emission reductions, elimination of hazardous materials, etc.)
  - Economic benefits (e.g.: manufacturing jobs or technical services jobs created or retained, life-cycle cost reductions, etc.)
- **Identify** other benefits (e.g.: lowering the cost of compliance with regulations, reducing the probability of equipment failure, etc.)
- **Describe** how the success of the project can be measured or verified, and how and for how long these metrics will be provided to NORA.

6. Commercialization Plan (two pages)

Describe how project results will be commercialized or deployed. Projects nearing a demonstration phase should have a detailed commercialization plan, whereas an early-stage concept should be accompanied by at least a rough outline of how the concept may ultimately be deployed. Cover the following topics:

- **Project Roadmap:** Provide a multi-year timeline (e.g., graph) showing the paths, activities, milestones, resources, and timing to take the technology from its current state of development to commercial deployment.
- **Marketing:** Identify target markets and their characteristics, e.g., size, competition, trends (regulatory, technological, etc.); describe your proposed marketing strategies, explain why they should be successful, and provide sales estimates. Provide an estimate of the price of the product or service that eventually will be commercialized and provide a comparison of that price to competing products or services.
- **Briefly explain** the customer's economic motivation for buying the new product or service, versus alternatives.
- **Design & Production:** Describe remaining technical development steps leading to start of manufacturing or deployment. Describe plans for setting up facilities for manufacturing or other deployment activities. Discuss any key issues such as: need for specialized production equipment or strategic alliances; critical make/buy decisions or cost/volume issues; and, plans for ancillary activities such as service support functions.
- **Finance:** Estimate funds required to go from the current stage of development to a financially self-sustaining level of commercialization; include funding for R&D and initial marketing and manufacturing/deployment programs. Identify potential funding sources and how those sources will be addressed. Identify any potential strategic partners who could reduce your costs by providing access to marketing/distribution channels, manufacturing

facilities or other assets.

- **Organization Plan:** Describe staffing plans for transitioning from R&D stage to commercialization stage; include all organizational functions, such as management, administration, engineering, marketing/sales, and manufacturing.
- **Technology Transfer:** Describe any other actions to promote the new technology, such as the presentation of technical papers.

7. Budget – A Contract Pricing Proposal Form (CPPF), with associated instructions, is provided as an attachment to this PON. A CPPF Excel spreadsheet is available on the NORA website. Each proposal must include a completed CPPF and also a cost-sharing table identifying the allocation of funding by task. Use the following format (expand table as needed):

Cost-Sharing Table:

Funding Source	Task 1 ($)	Task 2 ($)	...	...	Project Total ($)
NORA					
Proposer					
Co-Funder(s) (identify)					
Task Total ($)					

The proposal must show the proposer providing **co-funding of at least 20%** of the total cost of the project. This co-funding can be from the proposer, other team members, and other government or private sources. Contributions of direct labor for which the laborer is paid, and purchased materials, may be considered “cash” contributions. Unpaid labor, unbilled labor by employees of government or professional organizations, and overhead expenses are typically offered as “in-kind” contributions.

8. Appendices – Include any resumes, company qualifications, or ancillary information deemed necessary to support your proposal. If appropriate, also include:

Letters of Interest or Commitment – If you are relying on any other organization to do some of the work, provide services or equipment, or share in the non-NORA cost, include a letter from that organization describing their planned participation. Also include letters of interest or commitment from businesses or other organizations critical to the future commercialization, demonstration, or implementation of the project. Absence of letters of interest or commitment will be interpreted as the proposer not having support from the identified parties.

Proposal Evaluation:

Proposals will be reviewed by the NORA Research Committee selected by the NORA chairman,

and will include oil dealers and technical experts and will be scored and ranked according to the following criteria, **listed in order of importance**. After the proposals are reviewed, NORA will issue a letter to each proposer indicating the proposal evaluation results. Proposers receiving favorable evaluations will be invited to enter into contract negotiations with NORA. Such proposers will be required to submit a detailed statement of work, budget, and schedule, and may also be asked to address specific questions or recommendations of the NORA Research Committee before contract award.

III. GENERAL CONDITIONS

Proprietary Information - Careful consideration should be given before confidential information is submitted to NORA as part of your proposal. Review should include whether it is critical for evaluating a proposal, and whether general, non-confidential information, may be adequate for review purposes.

Contract Award - NORA anticipates making multiple awards under this solicitation. It may award a contract based on initial applications without discussion, or following limited discussion or negotiations. Each offer should be submitted using the most favorable cost and technical terms. NORA may request additional data or material to support applications. NORA will use the Sample Agreement to contract successful proposals. NORA expects to notify proposers in approximately six weeks from the proposal due date whether your proposal has been selected to receive an award or will require further consideration.

Limitation - This solicitation does not commit NORA to award a contract, pay any costs incurred in preparing a proposal, or to procure or contract for services or supplies. NORA reserves the right to accept or reject any or all proposals received, to negotiate with all qualified sources, or to cancel in part or in its entirety the solicitation when it is in NORA's best interest.

Disclosure Requirement - The proposer shall disclose any indictment for any alleged felony, or any conviction for a felony within the past five years, under the laws of the United States or any state or territory of the United States, and shall describe circumstances for each. When a proposer is an association, partnership, corporation, or other organization, this disclosure requirement includes the organization and its officers, partners, and directors or members of any similarly governing body. If an indictment or conviction should come to the attention of NORA after the award of a contract, NORA may exercise its stop-work right pending further investigation, or terminate the agreement; the contractor may be subject to penalties for violation of any law which may apply in the particular circumstances. Proposers must also disclose if they have ever been debarred or suspended by any agency of the U.S. Government, State or local jurisdiction.

Attachments

Attachment A - Proposal Checklist
Attachment B - Sample Contract Pricing Proposal Form and Instructions
Attachment C - Evaluation Criteria in Order of Importance

Attachment A: PROPOSAL CHECKLIST

Proposal Title		Due Date	
Primary Contact (Prime Contractor)		Title	
Company		Phone	Fax
Address	City	State or Province	Zip
e-mail address			
Secondary Contact		Title	
Company		Phone	Fax
Address	City	State or Province	Zip
e-mail address			
The prime contractor must sign this form below.			
THE PRIME CONTRACTOR MUST ANSWER THE FOLLOWING QUESTIONS:			
Do you accept all Terms & Conditions in the Sample Agreement? (if no, explain on separate pg) __ Yes __ No Have you been indicted/convicted for a felony within the past 5 years? (if yes, explain on separate pg) __ Yes __ No Are you submitting the required number of copies? (See proposal instructions.) __ Yes __ No Is other public funding pending/awarded on this and/or very-similar topic (prior and/or competing proposals)? __ Yes __ No (if yes, explain on separate page) Have you retained, employed, or designated any person or organization to attempt to influence the procurement process with respect to this solicitation? __ Yes __ No			
ON WHAT PAGE IN YOUR PROPOSAL CAN THESE ITEMS BE FOUND?			
Executive Summary ___ Problem Statement and Proposed Solution ___ Proposed Statement of Work and Schedule ___ Proposer Qualifications ___ Project Benefits ___		Commercialization Plan ___ Cost-Sharing Chart ___ Exceptions to Terms & Conditions (if applicable) ____ Completed and Signed Contract Pricing Proposal Form(s) ____ Letters of commitment from all participating organizations ___	
AUTHORIZED SIGNATURE			
I certify that the above information is accurate, and that the proposal requirements noted have been completed and are enclosed. I understand that this proposal may be disqualified if the solicitation requirements are not met. I the undersigned am authorized to commit my organization to this proposal.			
Signature		Name	
Title		Organization	
Phone		Date	

NOTE: This completed form **MUST** be attached to the front of all copies of your proposal.

Attachment B: Contract Pricing Proposal Form

National Oilheat Research Institute			PON No. / Category		Page
Contractor: Address:			Name of Proposed Project:		
Location (where work is to be performed):			NORA funding: Total Project Cost:		
Cost Element			Total Project Cost	NORA Funding Requested	Cost-sharing & Other Co-funding
1. Direct Materials					
a. Purchased Parts					
b. Other					
Total Direct Materials					
2. Materials Overhead Rate:					
3. Direct Labor (specify names/titles)	Hours	Rate/hr			
Total Direct Labor					
4. Labor Overhead	Rate %	$ Base			
Total Labor Overhead					
5. Outside Special Testing					
6. Equipment					
7. Travel					
8. Other Direct Costs					
9. Subcontractors/Consultants					
Total Subcontractors/Consultants					
10. General & Administrative Expense	Rate %	Element(s)			
11. Total Estimated Project Cost					
This proposal reflects our best estimates as of this date, in accordance with the instructions to proposers.					
Typed Name and Title:		Signature:			Date:
Has any executive agency of the U.S. government performed any review of your records in connection with any prime contract or subcontract within the past twelve months? ____ Yes ____ No If yes, identify:					

Supporting Schedule - Contract Pricing Proposal Form

Element No.	Item Description	Amount

Instructions for Preparation of Cost Estimate

Your cost proposal may be the basis of contract negotiation; it should be specific and complete in every detail. Supporting schedules (as described in Section B) providing the basis for your estimates must be provided.

A. GENERAL

The schedule must be submitted on NORA's Contract Pricing Proposal Form.

B. INSTRUCTIONS AND DESCRIPTION OF REQUIRED SUPPORT DETAIL

(Title each supporting schedule and cross-reference it to the item number on the Contract Pricing Proposal Form)

1a. DIRECT MATERIALS - PURCHASED PARTS

Provide the following information for each proposed item with an estimated unit cost in excess of $5,000.

- Description of item
- Proposed vendor
- Quantity needed
- Unit cost
- Basis for cost (i.e., catalog, prior purchase, quote, etc.)
- Total cost
- Evidence of a competitive selection process

1b. OTHER DIRECT MATERIALS

For all items in excess of $5,000, provide whatever information would be necessary to understand what is being obtained, how it is being obtained, what it will cost and how the estimated cost was determined with justification for all items.

2. MATERIALS OVERHEAD (also applicable to other Indirect Rate categories: .

3. DIRECT LABOR

a. Commercial Enterprises

(1) Attach supporting schedules showing:

- Each category or type of labor being estimated
- Applicable labor rates per hour (straight-time)

(2) Explain the method used for computing the rates (i.e., actual of an individual, actual average of a category or other grouping, etc.) Also identify any proposed labor escalation and the bases for it.

b. Educational Institutions

Provide the following for each calendar year of the contract:

(1) For individuals not on an “actual hours worked" basis:

- individual's name

- annual salary and the period for which the salary is applicable (preferably in weeks)
- the proportionate time to be charged to this effort.

(2) For individuals who maintain time records as the basis for charging costs, supply the detail as requested in Instructions 3(a)(1)

4. LABOR OVERHEAD (Same as Instructions for 2. MATERIALS OVERHEAD)
5. OUTSIDE SPECIAL TESTING
   a. Describe the effort.
   b. Provide the units of time (hours, days, weeks), cost rates, and the vendor.
   c. In accordance with the requirements of Section 5.02 of the attached Sample Agreement, provide the basis for selection of the vendor. Explain and justify the basis for any non-competitive selection.
6. EQUIPMENT

Capability to perform the work with existing facilities and equipment is assumed. It is NORA's policy not to compensate for general purpose facilities or equipment. If some special purpose items are needed solely for this contract and are not available by other means (contractor assets, lease, etc.), then provide the following information for each item of required equipment.

- vendor
- model number
- quantity
- competitive selection process
- unit cost and source of cost/price (i.e., quote, catalog , purchase history)
- description of the use or application (NORA dedicated, contract dedicated, other)

7. TRAVEL
   a NORA will accept as a direct charge only that travel required to perform the statement of work.
   b. Attach a schedule indicating the need for the proposed travel, the estimated number of person-trips required, destinations, mode and cost of transportation, and number of days subsistence per trip for each destination.
   c. Identify and support any other special transportation costs required in the performance of this project.
8. OTHER DIRECT COSTS
   a. Identify the type of cost (i.e. postage, telephone, publications, graphics, etc.)
   b. Provide cost details for the amounts estimated (hours or units, rates, etc.)
   c. For computer costs identify the make, model and type of computer, hours of service and appropriate rates, and whether the machine is company owned or leased.
9. SUBCONTRACTORS/CONSULTANTS
   a. Explain the specific technical area in which such service is to be used and identify the contemplated consultants.
   b. State the number of days and the hours per day of such service estimated to be required

and the consultant's quoted rate per day. Document when/where the consultant has received the proposed rate in performing similar services for others.

10. GENERAL & ADMINISTRATIVE (G&A) EXPENSE (Same as instructions for 2. MATERIALS OVERHEAD)
    - If Government-approved indirect rates are proposed, then supply a copy of an appropriate Government document verifying those rates.
    - If Government-approved rates are not proposed, supply the following, unless previously provided, for the years comprising the proposed period of contract performance.
    - A description (chart or other) of the organization of the indirect cost center.
    - The budget of indirect costs, by account, for each proposed indirect expense rate.
    - The budget for the base, for each proposed rate, (direct labor dollars, hours, costs, etc.) itemized as to contract hours or costs, research and development hours of costs, and any other direct base effort.
    - Actual incurred rates for the prior three years, including actual base and pool amounts.

Attachment C - Evaluation Criteria in Order of Importance

1. Industry Impact (40%)
    - How significant is the problem or opportunity?
    - Is the proposed project likely to solve the problem or exploit the opportunity?
    - Is the proposed work technically feasible, innovative, and superior to alternatives?
    - Is the work strategy sound?
2. Project Risk (20%)
    - Will the project result in a product, standard or process that will be on the market within three years?
    - List key issues to be overcome.
    - What is the likelihood of success?
    - What is the likelihood of success within the project timeframe?
3. Proposer(s) (20%)
    - To what degree does the team have relevant and necessary technical and business background and experience?
    - How firm are the commitments and support from essential participants, co-funders, and related businesses and other organizations?
4. Project Outcome/Commercialization Strategy and Cost (20%)
    - Is the overall project cost justified based on the expected benefits?
    - Relative to the project cost, how significant is the potential market or deployment opportunity?
    - Is the implementation or commercialization strategy well-conceived and appropriate for the stage of development?
    - How appropriate are the proposer's co-funding contributions (sources and amounts) with respect to the degree of risk, potential to benefit from the work, and financial status of the organization?

Other Considerations – Proposals will be reviewed to determine if they reflect NORA's overall objectives, including: risk/reward relationships, similar ongoing or completed projects, the general distribution of NORA projects among the Oilheat industry and other organizations.