

# Wood Heater Innovation Collaboration (WHIC) Collaborative Research and Development Agreement (CRADA) Call

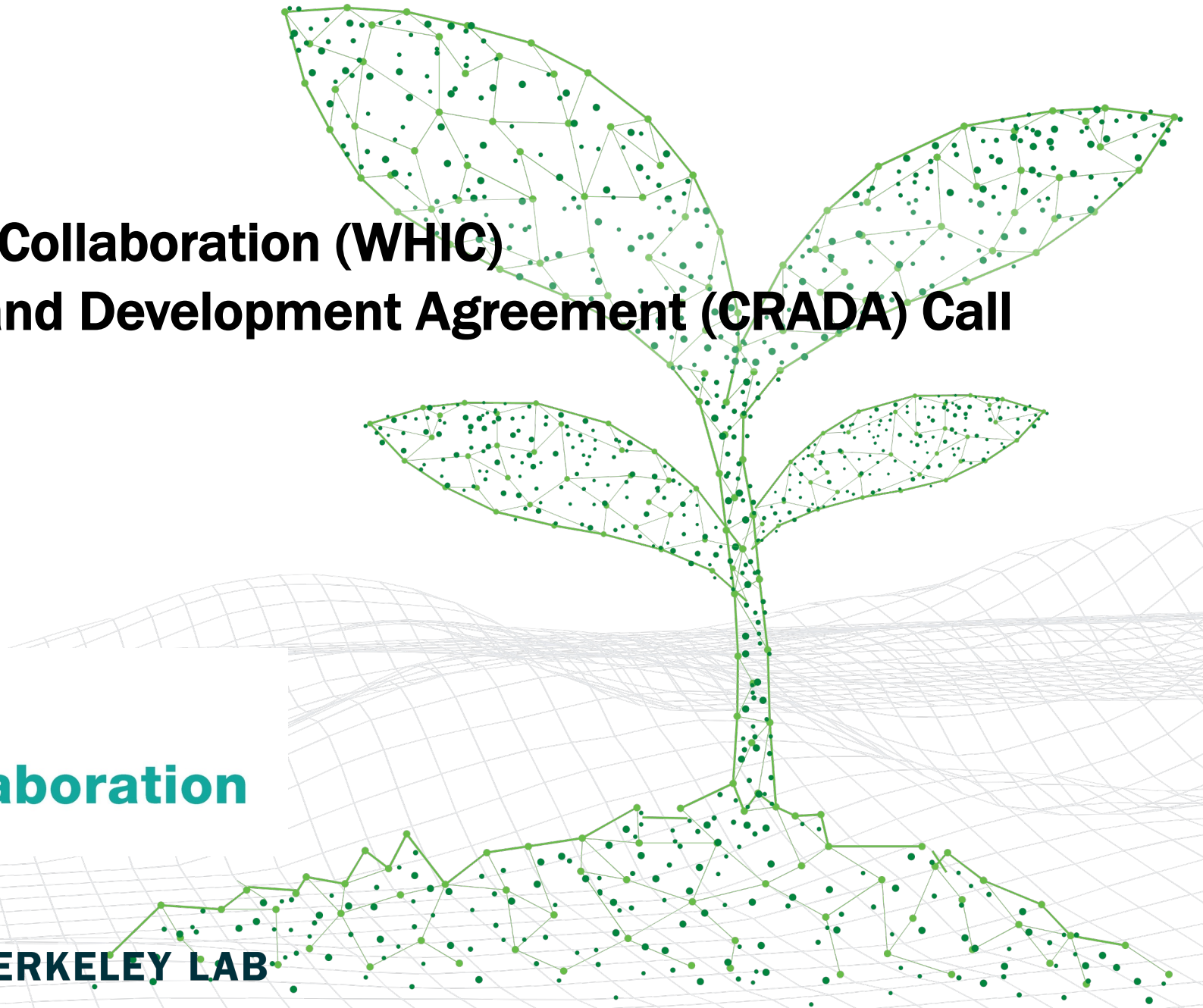
Mark Shmorhun  
Rebecca Trojanowski  
Vi Rapp  
Tom Butcher  
June 16, 2023



**Wood Heater  
Innovation Collaboration**



**BERKELEY LAB**



A long train of black tanker cars is visible on a track, stretching into the distance. The train is positioned next to a lush green cornfield. The sky is clear and blue. The text "I. Bioenergy Technologies Office Overview" is overlaid on the image in white.

# I. Bioenergy Technologies Office Overview

*Photo by iStock*

# BETO Mission, Vision, and Strategic Goals



A thriving and sustainable bioeconomy fueled by innovative technologies

Developing transformative and revolutionary sustainable bioenergy and coproduct technologies for a prosperous nation

Develop industrially relevant technologies to enable domestically produced biofuels, biopower, and coproducts

Feedstock  
Technologies



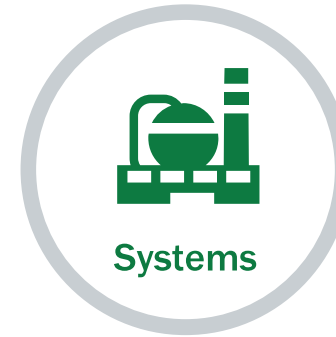
Advanced  
Algal Systems



Conversion  
Technologies



Systems  
Development  
and Integration



Data, Modeling,  
and Analysis



Bioenergy  
Technologies Office  
Program Areas

# BETO Critical Program Areas

## Production and Harvesting

- **Feedstock Technologies**  
Lower cost, improve quality, and increase types of renewable carbon feedstock intermediates available for conversion.
- **Advanced Algal Systems**  
Increase algae productivity through algal strain improvement and efficient cultivation.



## Conversion and Refining

- **Conversion Technologies**  
Reduce costs of deconstructing feedstock into intermediate products (such as sugars, intermediate chemicals, bio-oils, or gaseous mixtures)  
Upgrading intermediates into liquid biofuels, bioproducts, and biopower



## Distribution and End Use

- **Systems Development and Integration**  
Systems research to combine tech components, unit operations, or subsystems developed by R&D programs into integrated processes.  
Integrated processes tested (pre-pilot to demo scale) to identify further R&D needs or verify readiness for scale-up and commercialization.

## Crosscutting

- **Data, Modeling, and Analysis**  
Track technology progress and identify opportunities and challenges related to economic/environmental impact of advanced bioenergy systems.

# Wood Heater Funding Opportunities

## FY23 Appropriations Bill

- The agreement provides up to \$5,000,000 for continued support of the development and testing of new domestic manufactured low-emission, high-efficiency, residential wood heaters that supply easily accessed and affordable renewable energy and have the potential to reduce the national costs associated with thermal energy.

## Prior Successes

- Funding via competitive funding opportunity announcements (FOA) and wood heater technology development at national laboratories.
  - 3 FOA's F19 – FY21
  - Technology development at Brookhaven National Lab and Lawrence Berkeley National Lab
  - 5<sup>th</sup> Wood Heater Design Challenge
  - FY22 Workshop Series

## Wood Heater Innovation Collaboration CRADA Call Announced June 1, 2023



# FY23 Wood Heater Innovation Collaboration CRADA

*Photo by iStock*

# FY23 Wood Heater Innovation Collaboration CRADA Call

A **Cooperative Research and Development Agreement (CRADA)** is any formal written agreement between one or more Federal laboratories and one or more non-Federal parties under which the government, through its laboratories, provides personnel, services, facilities, equipment, intellectual property, or other resources. <https://www.doi.gov/techtransfer/crada>

## Wood Heater Innovation Collaboration CRADA Call

- Brookhaven National Laboratory (BNL) and Lawrence Berkeley National Laboratory (LBNL), funded by the DOE Bioenergy Technologies Office (BETO), will oversee a Cooperative Research and Development Agreement (CRADA) to **accelerate wood heater innovation and develop the next generation of efficient and clean wood heaters.**
- No less than **\$4 million** will be available for this CRADA call and **up to six projects per phase** will be selected with a **project duration of 12 to 18 months.**
- Intended for industry and universities interested in leveraging the Wood Heater Innovation Collaboration (WHIC) capabilities to support the advancement of residential wood heating technologies.
- Simpler proposal process / agile funding opportunity





**BERKELEY LAB**  
Berkeley, CA

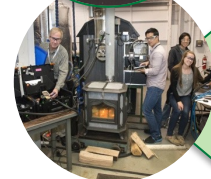


**Brookhaven**  
National Laboratory  
Upton, NY

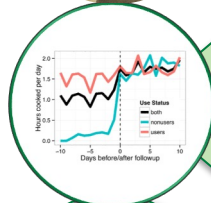
## What we offer



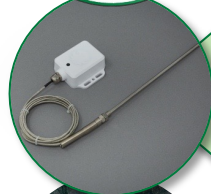
Novel technology development and validation



Laboratory testing for R&D



Data analysis to inform R&D



Monitoring, sensors, and automation development



Field testing and evaluation



Quantifying user behavior and community education

## Capabilities

Experienced teams with state-of-the-art facilities and resources:

- Real-time gaseous and particle emissions
- Thermal Performance
- Computational modeling and validation
- And more...



Berkeley Lab Facility  
[stoves.lbl.gov](http://stoves.lbl.gov)

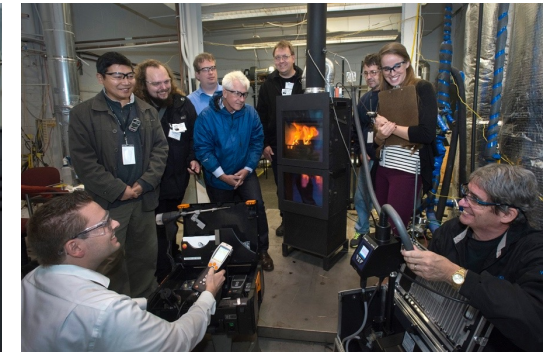
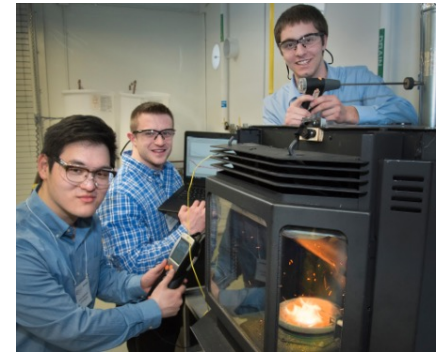


Brookhaven Lab Facility  
[bnl.gov/isd/conversion](http://bnl.gov/isd/conversion)



## Applicants and National Lab partners sign CRADA Agreement that includes:

- I. Definitions
- II. Statement of work, term, funding and costs
- III. Personal property
- IV. Disclaimer
- V. Product liability
- VI. Rights in subject inventions
- VII. Rights in data
- VIII. U.S. Competitiveness
- IX. Export control
- X. Reports and publications
- XI. Force Majeure
- XII. Disputes
- XIII. Entire CRADA, modifications, administration, and termination



[https://woodheat.bnl.lbl.gov/sites/default/files/2023-06/WHICCRADA\\_15JUN2023\\_1.docx](https://woodheat.bnl.lbl.gov/sites/default/files/2023-06/WHICCRADA_15JUN2023_1.docx)



- All U.S. companies and universities, and foreign companies and universities with commercial partners based in the U.S., subject to DOE headquarters approval of the project
- Individual U.S. citizens and lawful permanent residents
- Domestic for-profit entities, educational institutions, and nonprofits that are incorporated (or otherwise formed) under the laws of a particular state or territory of the United States and have a physical location for business operations in the United States
  - (Nonprofit organizations described in Section 501(c)(4) of the Internal Revenue Code of 1986 that engaged in lobbying activities after December 31, 1995, are not eligible to apply.)



- **Foreign entities**, whether for-profit or otherwise. Other than as provided in the section above, recipients **must be incorporated** (or otherwise formed) **under the laws of a state or territory of the United States and have a physical location for business operations in the United States.**
  - If a foreign entity applies, it must designate in the full application a subsidiary or affiliate incorporated (or otherwise formed) under the laws of a state or territory of the United States to be a recipient.
  - The full application must state the nature of the corporate relationship between the foreign entity and domestic subsidiary or affiliate.

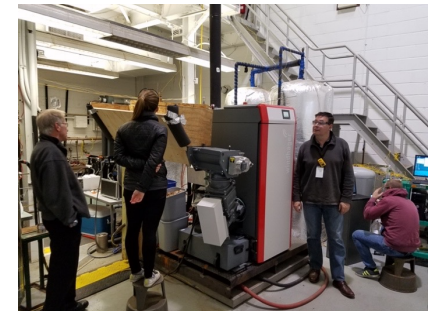
**Note: All applicants are required to register in [sam.gov](https://sam.gov) and have a Unique Entity Identifier for doing business with federal agencies**

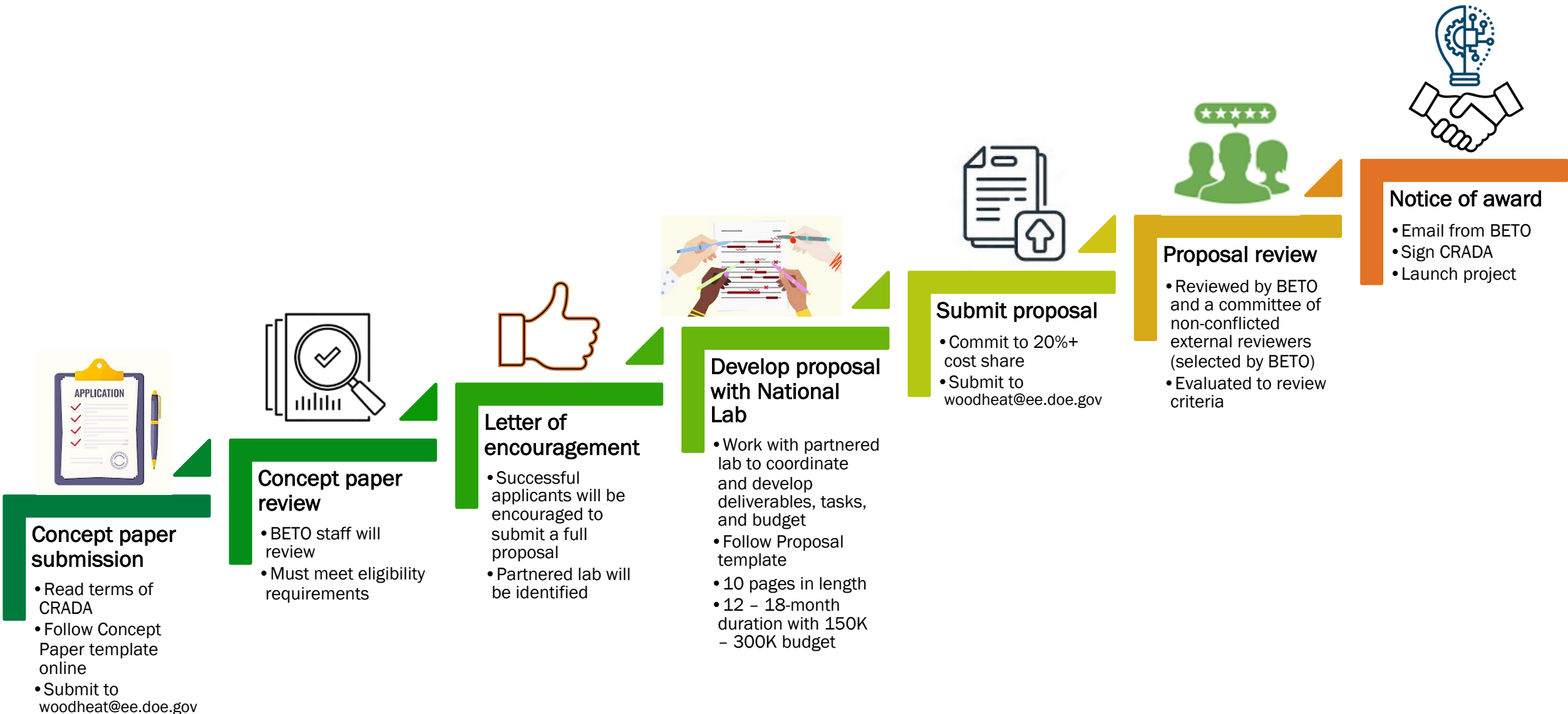
## Example Activities

- Advancing automation systems
- Sensor development for remote data collection
- Analyzing and synthesizing field and laboratory data
- Investigating feasibility of novel pre and post combustion technologies to reduce emissions or improve efficiency
- Developing computational models to inform engineering design improvements
- Investigating feasibility of integrating wood heaters with other technologies to reduce emissions and increase efficiency
- Identifying and implementing advanced combustion methods or technologies to reduce emissions during various phases of operation
- Developing alternative test methods for certifying wood heaters that cannot be tested using EPA certification methods

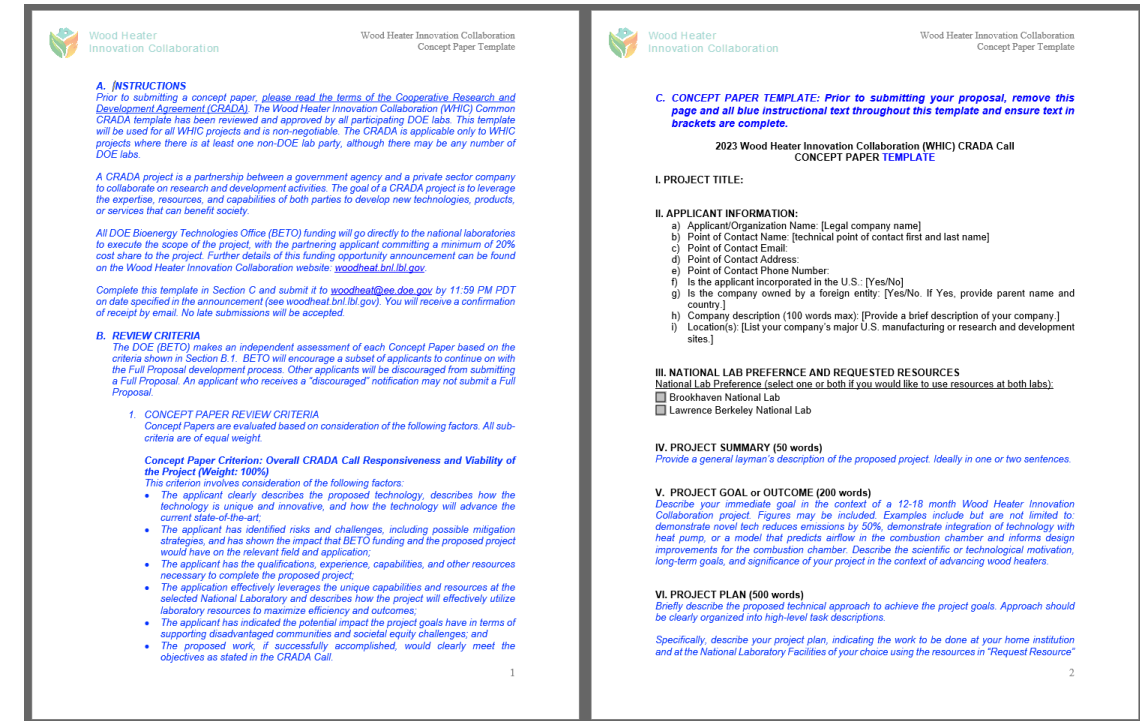
## Activities not considered

- Certification testing of wood heaters
- Testing and advancing technologies not related to wood heaters
- Dual-fuel technologies that integrate wood heaters with pipeline natural gas, propane resources, e.g. or appliances





- Project title
- Applicant information
- Select National Lab preference
- Project summary
  - 1 – 2 sentences in general terms
- Project goal or outcome
  - Scientific or technological motivation and significance
- Project plan
  - Technical approach
- Relevant experience
  - Skills and expertise of team
- Need for support
  - How will National Lab support your project
- Supporting disadvantaged communities
  - How will this project support underserved communities
- References



Wood Heater Innovation Collaboration

Wood Heater Innovation Collaboration  
Concept Paper Template

**A. INSTRUCTIONS**  
Prior to submitting a concept paper, please read the terms of the Cooperative Research and Development Agreement (CRADA). The Wood Heater Innovation Collaboration (WHIC) Common CRADA template has been reviewed and approved by all participating DOE labs. This template will be used for all WHIC projects and is non-negotiable. The CRADA is applicable only to WHIC projects where there is at least one non-DOE lab party, although there may be any number of DOE labs.

A CRADA project is a partnership between a government agency and a private sector company to collaborate on research and development activities. The goal of a CRADA project is to leverage the expertise, resources, and capabilities of both parties to develop new technologies, products, or services that can benefit society.

All DOE Bioenergy Technologies Office (BETO) funding will go directly to the national laboratories to execute the scope of the project, with the partnering applicant contributing a minimum of 20% cost share to the project. Further details of this funding opportunity announcement can be found on the Wood Heater Innovation Collaboration website: [woodheat.bnl.gov](http://woodheat.bnl.gov).

Complete this template in Section C and submit it to [woodheat@ee.doe.gov](mailto:woodheat@ee.doe.gov) by 11:59 PM PDT on date specified in the announcement (see [woodheat.bnl.gov](http://woodheat.bnl.gov)). You will receive a confirmation of receipt by email. No late submissions will be accepted.

**B. REVIEW CRITERIA**  
The DOE (BETO) makes an independent assessment of each Concept Paper based on the criteria shown in Section B.1. BETO will encourage a subset of applicants to continue on with the Full Proposal development process. Other applicants will be discouraged from submitting a Full Proposal. An applicant who receives a "discouraged" notification may not submit a Full Proposal.

1. CONCEPT PAPER REVIEW CRITERIA  
Concept Papers are evaluated based on consideration of the following factors. All sub-criteria are of equal weight.

**Concept Paper Criterion: Overall CRADA Call Responsiveness and Viability of the Project (Weight: 100%)**  
This criterion involves consideration of the following factors:

- The applicant clearly describes the proposed technology, describes how the technology is unique and innovative, and how the technology will advance the current state-of-the-art;
- The applicant has identified risks and challenges, including possible mitigation strategies, and has shown the impact that BETO funding and the proposed project would have on the relevant field and application;
- The applicant has the qualifications, experience, capabilities, and other resources necessary to complete the proposed project;
- The application effectively leverages the unique capabilities and resources at the selected National Laboratory and describes how the project will effectively utilize laboratory resources to maximize efficiency and outcomes;
- The applicant has indicated the potential impact the project goals have in terms of supporting disadvantaged communities and societal equity challenges; and
- The proposed work, if successfully accomplished, would clearly meet the objectives as stated in the CRADA Call.

1

Wood Heater Innovation Collaboration

Wood Heater Innovation Collaboration  
Concept Paper Template

**C. CONCEPT PAPER TEMPLATE: Prior to submitting your proposal, remove this page and all blue instructional text throughout this template and ensure text in brackets are complete.**

2023 Wood Heater Innovation Collaboration (WHIC) CRADA Call  
CONCEPT PAPER TEMPLATE

**I. PROJECT TITLE:**

**II. APPLICANT INFORMATION:**

a) Applicant/Organization Name: [Legal company name]  
b) Point of Contact Name: [technical point of contact first and last name]  
c) Point of Contact Email:  
d) Point of Contact Address:  
e) Point of Contact Phone Number:  
f) Is the applicant incorporated in the U.S.: [Yes/No]  
g) Is the company owned by a foreign entity: [Yes/No. If Yes, provide parent name and country.]  
h) Company description (100 words max): [Provide a brief description of your company.]  
i) Location(s): [List your company's major U.S. manufacturing or research and development sites.]

**III. NATIONAL LAB PREFERENCE AND REQUESTED RESOURCES**  
National Lab Preference (select one or both if you would like to use resources at both labs):  
 Brookhaven National Lab  
 Lawrence Berkeley National Lab

**IV. PROJECT SUMMARY (50 words)**  
Provide a general layman's description of the proposed project. Ideally in one or two sentences.

**V. PROJECT GOAL or OUTCOME (200 words)**  
Describe your immediate goal in the context of a 12-18 month Wood Heater Innovation Collaboration project. Figures may be included. Examples include but are not limited to: demonstrate novel tech reduces emissions by 50%, demonstrate integration of technology with heat pump, or a model that predicts airflow in the combustion chamber and informs design improvements for the combustion chamber. Describe the scientific or technological motivation, long-term goals, and significance of your project in the context of advancing wood heaters.

**VI. PROJECT PLAN (500 words)**  
Briefly describe the proposed technical approach to achieve the project goals. Approach should be clearly organized into high-level task descriptions.  
Specifically, describe your project plan, indicating the work to be done at your home institution and at the National Laboratory Facilities of your choice using the resources in "Request Resource"

2

[https://woodheat.bnl.gov/sites/default/files/2023-05/02-BETO-WHIC-ConceptPaper\\_Template\\_Published.docx](https://woodheat.bnl.gov/sites/default/files/2023-05/02-BETO-WHIC-ConceptPaper_Template_Published.docx)

Send to [WoodHeat@ee.doe.gov](mailto:WoodHeat@ee.doe.gov)  
by 8/11/2023 11:59 PT





- The applicant clearly describes the proposed technology, describes how the technology is unique and innovative, and how the technology will advance the current state-of-the-art;
- The applicant has identified risks and challenges, including possible mitigation strategies, and has shown the impact that BETO funding and the proposed project would have on the relevant field and application;
- The applicant has the qualifications, experience, capabilities, and other resources necessary to complete the proposed project;
- The application effectively leverages the unique capabilities and resources at the selected National Laboratory and describes how the project will effectively utilize laboratory resources to maximize efficiency and outcomes;
- The applicant has indicated the potential impact the project goals have in terms of supporting disadvantaged communities and societal equity challenges; and
- The proposed work, if successfully accomplished, would clearly meet the objectives as stated in the CRADA Call.

**Note: All criteria are of equal weight**



## NATIONAL LAB PARTNERS ARE EXPECTED TO SUPPORT PROPOSAL DEVELOPMENT

### 1. Executive Summary

- i. Brief description of technical problem and impacts

### 2. Project goal and technical approach

- i. Technological motivation and goals

### 3. Identification of risk and risk mitigation strategies

- i. Describe risks and strategies to address them

### 4. Supporting disadvantaged communities

- i. How will this project support underserved communities
- ii. Provide a market transition plan

### 5. Team organization and capabilities

- i. Skills and expertise of team and partnering lab

### 6. Duration, tasks/deliverables, schedule and budget

- i. Schedule of tasks and deliverables and responsible team member
- ii. Align budget with each task

### 7. References

Wood Heater Innovation Collaboration (WHIC)  
Cooperative Research and Development Agreement (CRADA) Call

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Using the template provide in Section C, please describe the work you propose to carry out in no more than ten (10) pages. Project duration is 12 to 18 months. Replace text in brackets with appropriate text. All sections must be completed. Note that section lengths in parentheses are suggestions and can be removed before submission. Actual section lengths are at the discretion of the author. Percentages in parentheses provide prior to the section title are the score weighting of each reviewer-scored section.

Please work with your partnering National Laboratory to complete the proposal leaks and budget. Submit the proposal to [woodheat@ee.doe.gov](mailto:woodheat@ee.doe.gov) by 11:59 PM PDT on date specified in the announcement (see [woodheat.bnl.gov](http://woodheat.bnl.gov)). You will receive a confirmation of receipt by email. No late submissions will be accepted.

**B. REVIEW CRITERIA**  
BETO and a panel of non-conflicted external reviewers selected by BETO will perform proposal reviews based on review criteria outlined in Section B.1. Reviewers will score the proposals based on the associated weighting of each criteria. Final funding decisions will be made by BETO based on funding availability and portfolio requirements.

**1. PROPOSAL REVIEW CRITERIA**  
Proposals are evaluated based on consideration of the below factors. All sub-criteria show allocated points.

Project Goal and Technical Approach (30%)		
Measurable	The project goal is clearly defined and measurable, with specific metrics for success.	5
Related to BETO Portfolio/Goals	The project goal is relevant to overall BETO objectives and aligns with the needs of BETO.	5
Feasibility of Technical Approach	The project goal is feasible within the available resources, including time, budget, and personnel.	10

Wood Heater Innovation Collaboration (WHIC)  
Cooperative Research and Development Agreement (CRADA) Call

Innovative	The technical approach is clearly and thoroughly described, with specific steps and methods for achieving the project goal.  The overall proposal is clear, well-organized, and coherent, with a logical flow of ideas and a clear connection between the project goal and technical approach. The feasibility of the proposed work, as justified by appropriate background, theory, simulation, modeling, experimental data, or other sound scientific and engineering practices.	5
Impact	The project goal demonstrates innovation and creativity in addressing a relevant challenge or problem.  The project goal and technical approach are expected to have a significant impact on the relevant field or community, and the proposed outcomes are meaningful and relevant.  The project goal is advanced compared to existing or emerging technologies.	5
<b>Total Points</b>		<b>30</b>
<b>Identification of risks and risk mitigation strategies (15%)</b>		
Identification and Risk Mitigation	The risk identification process is comprehensive, identifying all possible risks that may impact the project's success.  The risk mitigation strategies are feasible within the project's resources, including time, budget, and personnel.  The risks are prioritized based on their potential impact.	10
Impact	The risk management plan is expected to have a little to no significant impact on the project's success. The risk mitigation strategies are expected to be effective in minimizing or eliminating the potential impact of the identified risks.	5
<b>Total Points</b>		<b>15</b>
<b>Impact and Supporting Disadvantaged Communities (20%)</b>		
Inclusion	The project has identified or includes a clear plan for engaging and involving disadvantaged communities in the project's development and implementation.	5
Equity	The project demonstrates a commitment to equity, addressing social and economic disparities, and promoting inclusive practices.	5
Impact	The project demonstrates a clear understanding of the challenges and needs of disadvantaged communities and	10

[https://woodheat.bnl.gov/sites/default/files/2023-05/03-BETO-WHIC-Proposal\\_Template\\_Published.docx](https://woodheat.bnl.gov/sites/default/files/2023-05/03-BETO-WHIC-Proposal_Template_Published.docx)

Send to [WoodHeat@ee.doe.gov](mailto:WoodHeat@ee.doe.gov)  
by 11/03/2023 11:59 PT



## All applicant must certify they:

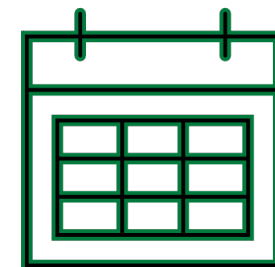
- Have reviewed the non-negotiable CRADA, which governs intellectual property and contractual terms
  - If your organization cannot agree to the terms and conditions enclosed, it will not be possible to support your project
- **Are requesting assistance that is not reasonably available in the private sector**
  - Projects are intended to make available the specialized expertise and equipment at the WHIC national labs, not compete with the private sector
- Commit to at least 20% cost share, which can be in-kind
  - Federal funds may not be used as cost share
- **Will allow non-proprietary information about your organization and the success of the assistance to be featured in publicly available stories by the U.S. Department of Energy (DOE) and the national labs**
- **Will be subject to DOE reviews and reporting requests, a statement of the anticipated cost share and regular reports detailing how this requirement is being met, as well as the execution of all appropriate partnership documents required by DOE**



Category	Brief Description	Weight
Project goal and technical approach	The project goal is innovative, measurable, relatable to BETO portfolio/goals, and feasible given the planned resources. The technical approach is clear, well organized, and justifiable.	30%
Identification of risks and risk management strategies	Comprehensive risk assessment with feasible mitigation strategies with little to no impact on project's success.	15%
Impact and supporting disadvantaged communities	The project demonstrates a commitment to equity and addressing social and/or economic disparities. The project addresses the needs of disadvantage communities using wood heaters and their challenges.	20%
Team organization and capabilities	The team has the expertise and qualifications needed for a successful project. The roles and responsibilities of each team member are well defined and how the members will collaborate for success.	15%
Duration, tasks/deliverables, schedule and budget	The proposed duration and schedule is realistic, and tasks are in sequential order with well defined deliverables. The budget is justifiable with each associated task.	20%



Date	Description
June 1 <sup>st</sup> , 2023	CRADA call phase 1 announcement
June 16 <sup>th</sup> , 2023	CRADA call webinar with open Q&A
August 11 <sup>th</sup> , 2023	Concept paper submission deadline (11:59 PT) to <a href="mailto:WoodHeat@ee.doe.gov">WoodHeat@ee.doe.gov</a>
September 1 <sup>st</sup> , 2023	Anticipated notification for proposal development
November 3 <sup>rd</sup> , 2023	Proposal submission deadline (11:59 PT) to <a href="mailto:WoodHeat@ee.doe.gov">WoodHeat@ee.doe.gov</a>
Week of December 18 <sup>th</sup> , 2023	Anticipated notification of proposal acceptance



# Questions?

Please type your questions into the chat box or email: [woodheat@lbl.gov](mailto:woodheat@lbl.gov)

All questions received will be added to our FAQ page: <https://woodheat.bnl.lbl.gov/faqs>



**Wood Heater  
Innovation Collaboration**



**Brookhaven**  
National Laboratory



**BERKELEY LAB**

U.S. DEPARTMENT OF  
**ENERGY**

Office of ENERGY EFFICIENCY  
& RENEWABLE ENERGY

BIOENERGY TECHNOLOGIES OFFICE





**Wood Heater  
Innovation Collaboration**

Learn more about WHIC CRADA: <https://woodheat.bnl.lbl.gov/>  
Or Email: [woodheat@lbl.gov](mailto:woodheat@lbl.gov)

Learn more about BETO: [energy.gov/bioenergy](https://energy.gov/bioenergy)

U.S. DEPARTMENT OF  
**ENERGY** | *Office of ENERGY EFFICIENCY  
& RENEWABLE ENERGY*  
BIOENERGY TECHNOLOGIES OFFICE



- **General cost sharing rules on a DOE award:**

- Cash Cost Share – encompasses all contributions to the project made by the recipient or subrecipient(s), for costs incurred and paid for during the project. This includes when an organization pays for personnel, supplies, equipment for their own company with organizational resources. If the item or service is reimbursed for, it is cash cost share. All cost share items must be necessary to the performance of the project.
- In-Kind Cost Share – encompasses all contributions to the project made by the recipient or subrecipient(s) that do not involve a payment or reimbursement and represent donated items or services. In-Kind cost share items include volunteer personnel hours, donated existing equipment, donated existing supplies. The cash value and calculations thereof for all In-Kind cost share items must be justified and explained in the Cost Share section of the project Budget Justification. All cost share items must be necessary to the performance of the project.
- Funds from other federal sources MAY NOT be counted as cost share.
- Fee or profit, including foregone fee or profit, are not allowable as project costs (including cost share) under any resulting award.

- **The specific rules applicable to:**

- FAR Part 31 for For-Profit entities, (48 CFR Part 31); and
- 2 CFR Part 200 Subpart E - Cost Principles for all other non-federal entities