Program Announcement
To DOE National Laboratories
LAB 09-16

Climatic Change Research
in
Terrestrial Ecosystems

SUMMARY: The Office of Science (SC), U.S. Department of Energy (DOE), hereby announces its interest in receiving Field Work Proposals (FWPs) from DOE National Laboratories for multiple topics in the design and demonstration of approaches to *in situ* manipulation of temperature or carbon dioxide concentration within terrestrial ecosystems. The FWPs will be peer reviewed before funding decisions are made.

Recent increases in global and regional temperature, and increases in the concentration of atmospheric carbon dioxide, are well documented. Moreover, it is expected, based on a broad range of sophisticated climate change models, that both warming and carbon dioxide concentration increase will continue for many decades. A critical need is to rapidly increase the scientific understanding of the potential effects of warming and increasing carbon dioxide concentration on the structure and functioning of terrestrial ecosystems. There are two interrelated aspects to this issue: (1) the potential effects of climatic change on the provision of ecosystem goods and services to society and (2) the potential for significant feedbacks from terrestrial ecosystems to climatic change, most notably changes in fluxes of energy and greenhouse gases between the atmosphere and terrestrial ecosystems.

In FY 2010 SC's Office of Biological and Environmental Research (BER) will address outstanding needs for new and improved "engineering" approaches to the experimental manipulation of temperature and carbon dioxide concentration in terrestrial ecosystems as the basis for improved field experiments to better address the issues articulated above. Projects of up to two years may be funded.

PREPROPOSALS: Potential applicants are **REQUIRED** to submit a brief preproposal, referencing Program Announcement LAB 09-16. The intent of preproposals is to minimize the time and effort of applicants in preparing and submitting formal project proposals that may be inappropriate for this Announcement.

Preproposals will be reviewed by BER for conformance with the guidelines presented in this Announcement and suitability in the technical areas specified in this Announcement.

Full proposals will be accepted **ONLY** from applicants who are notified by BER that their preproposal was selected to be developed into a full proposal.

Preproposals should consist of up to two pages total, including: (1) narrative describing the research objectives, (2) the technical approach(s) to be used, and (3) the proposed team members and their expertise. Preproposals will be reviewed relative to the scope and research needs as specified in this Announcement. At the top of the first page, the preproposal must identify the (lead) DOE National Laboratory, title of the project, name of the principal investigator (PI), the PI's telephone number and e-mail address, a list of all collaborating investigators and institutions (if any), and an estimate of the total annual costs of the project broken down by institution. The PI's email address will be used to communicate decisions about preproposals, so that email account must be monitored by the National Laboratory following preproposal submission.

DATES: Preproposals must be received by DOE before 4:30 PM, Eastern Daylight Time, **June 4, 2009**. They must be emailed to the address given below. A written response to the preproposals will be communicated, via email, to applicants within one week of the submission deadline. Applicants who have not received a response regarding the status of their preproposal by the time and date specified above are responsible for contacting BER (see Contact information below) to confirm its status.

Full proposals must be received no later than 4:30 PM Eastern Daylight Time, **July 29, 2009**, to be considered for award in Fiscal Year 2010. They must be emailed to the address given below.

ADDRESSES and SUBMISSION INSTRUCTIONS:

For preproposals submit a single PDF file as an email attachment. The size of the PDF file must not exceed 1 MB. Larger files may not be accepted.

Send the preproposal (i.e., PDF file) as an email attachment to Karen Carlson-Brown at: Karen.Carlson-Brown@science.doe.gov

The email subject line must be (without the quotation marks): "Program Announcement LAB 09-16"

Preproposal responses will be returned to the PI's email address listed in the preproposal.

For Formal Proposals

If accepted for full proposal development, the PI should:

Have your lab administrator submit the entire lab proposal and FWP via Searchable FWP (https://www.osti.gov/fwp). If you have questions about who your lab administrator is or how to use Searchable FWP, please contact the Searchable FWP Support Center.

Also, submit a single PDF file of the entire LAB proposal and FWP, as an email attachment. The size of the PDF file must not exceed 9 MB. Larger files may not be accepted.

Send the proposal (i.e., PDF file) as an email attachment to Karen Carlson-Brown at: Karen.Carlson-Brown@science.doe.gov

The email subject line must be (without the quotation marks): "Program Announcement LAB 09-16"

FOR FURTHER INFORMATION CONTACT:

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SUPPLEMENTARY INFORMATION: In FY 2010 BER will address the following three topics (i.e., soil warming, air warming, and elevation of carbon dioxide concentration) in the design and demonstration (i.e., prototyping) of new or improved approaches to quantitatively manipulating temperature or carbon dioxide concentration in terrestrial ecosystems. This will be done through detailed heat and mass transport simulation, laboratory development of needed hardware and software, and/or field demonstration as appropriate. Projects should be proposed for up to two years duration.

Soil Warming: New or improved approaches to warming soil, involving minimal disturbance to the physical organization of the soil and the plant roots occupying the soil, are desired. The warming should preserve the vertical soil temperature profile to a depth of at least 3 meters. The focus of this one- to two-year effort should be on the application of soil warming technologies to arctic tundra, including permafrost. Moreover, investigators are encouraged (but not required) to consider how soil warming technologies could eventually be applied to other high-impact ecosystems such as boreal forest, tropical forest, temperate forest, and grassland. The method(s) studied should be applicable to continuous, multi-year implementation and should be able to raise temperature as much as 10 degrees Celsius in arctic tundra, in order to study the full range of warming possible during the coming century (i.e., according to the Intergovernmental Panel on Climate Change Working Group I Fourth Assessment Report).

Air Warming: New or improved approaches to warming air (and therefore aboveground biomass), involving minimal disturbance to plants and plant canopies, are desired. The warming should be uniform throughout plant canopies. The focus of this one- to two-year effort should be on the application of air warming technologies to arctic tundra. Moreover, investigators are encouraged (but not required) to consider how air warming technologies could eventually be applied to additional high-impact ecosystems such as boreal forest, tropical forest, temperate forest, and grassland. The methods should be applicable to continuous, multi-year implementation and should be able to raise temperature as much as 10 degrees Celsius in arctic tundra, in order to study the full range of warming possible during the coming century (i.e., according to the Intergovernmental Panel on Climate Change Working Group I Fourth Assessment Report).

Elevated Carbon Dioxide Concentration: New or improved approaches to increasing the carbon dioxide concentration in the air enveloping terrestrial ecosystems, involving minimal disturbance to plants and plant canopies, are desired. The increase in carbon dioxide concentration should be uniform from the soil surface to the top of the tallest plants, or preserve the vertical carbon dioxide concentration profile to the top of the canopy. The focus of this one- to two-year effort should be on the application of carbon dioxide enrichment technologies to

arctic tundra. Moreover, investigators are encouraged (but not required) to consider how carbon dioxide enrichment technologies could eventually be applied to additional high-impact ecosystems such as boreal forest, tropical forest, temperate forest, and grassland. The approaches should be able to increase carbon dioxide concentration to at least 1000 ppm, in order to study the full range of carbon dioxide increase possible during the coming century (i.e., according to the Intergovernmental Panel on Climate Change Working Group I Fourth Assessment Report). Approaches that are more efficient in their use of carbon dioxide, relative to existing free-air carbon dioxide enrichment (FACE) approaches, are desired.

Scope of Individual Proposals:

Single proposals must **NOT** include work on both warming and carbon dioxide enrichment technologies. National Laboratories interested in pursuing research on both (i) warming and (ii) carbon dioxide increase technologies should submit separate proposals for each topic. Research on aboveground and belowground warming technologies can be combined in a single proposal.

Program Funding:

It is anticipated that up to $3 million will be available for awards in Fiscal Year 2010, contingent on the availability of appropriated funds. No individual proposal budget should exceed $1.5 million per year. Collaborative projects including participation by multiple DOE National Laboratories and/or non-National Laboratory researchers will be considered, but a single DOE National Laboratory must take the lead on the project and the preproposal requirements listed above will apply.

No more than $0.5 million per year will be allocated to new or improved approaches to carbon dioxide enrichment technologies (total for all carbon dioxide enrichment projects if multiple awards are made).

Eligibility: This is a DOE National Laboratory-Only Announcement. FFRDCs from other agencies are not eligible to submit preproposals or proposals in response to this Announcement. Partnerships between DOE National Laboratories and non-National Laboratory researchers are encouraged, as appropriate. Proposals with all collaborating parts (if any) should be submitted by the lead National Laboratory only.

Submission Information

The instructions and format described below must be followed. You must reference "Program Announcement LAB 09-16" on all submissions and inquiries about this Program Announcement.

Formal Proposals:

The research project description (i.e., PROJECT NARRATIVE) must be **15 pages or less**, exclusive of attachments and the required one-page abstract (see below). When printed on 8.5 by 11 inch pages the **margins must be at least one inch on all four edges**, and font size must be **at**

least 11 point, except for text on figures and in tables, as long as it is fully legible when printed. There must be no more than 6 lines of text per vertical inch of text.

Attachments include (and are limited to) curriculum vitae, a listing of all current and pending federal and Laboratory Directed Research and Development support, and letters of intent when collaborations are part of the proposed research. Curriculum vitae must be limited to two pages per individual.

The following is a list of essential items that a proposal must contain:

1. Field Work Proposal (FWP) Format (Reference DOE Order 412.1A) - Complete and signed by appropriate officials.

2. Proposal Cover Page

3. Table of Contents

4. Budget Page(s) (Form DOE F 4620.1) - Complete a separate Budget Page for the entire multi-year period for each separate participating institution, if applicable. http://www.science.doe.gov/grants/budgetform.pdf

5. Budget Description and Justification - Separately for each collaborating institution if applicable.

6. Other Project Information

a. A one-page abstract (on a page by itself): The abstract must include, at the top of the page: the (lead) DOE National Laboratory, title of the project, name of the principal investigator (PI), the PI's telephone number and e-mail address, and a list of all collaborating investigators (if any) and their institutions. The abstract must provide a summary of the project narrative, including the technical qualifications of the principal investigator.

b. Project Narrative (15 pages maximum): The project narrative must include a detailed description of the proposed research project, which must include a list of project milestones, a timeline of key activities, and clear statements of which project personnel will be responsible for each key activity.

c. Bibliography: A complete bibliographic listing of all the published scientific and engineering literature referred to in the project narrative.

d. Biographical Sketches: Relevant information about the background and experience of the principal investigator and co-principal investigators or collaborators (if any). Biographical sketches are limited to two pages per individual.

e. Facilities and Resources: Include information on the experience of the proposing institution(s), their facilities, and the available resources that would be relevant to successful completion of the project.

f. Statement of all current and pending support for the principal investigator and co- principal investigators and collaborators (if any), including the time devoted (each year) to each project by each named individual.

Evaluation Criteria

After an initial screening for eligibility and responsiveness to this Announcement, proposals will be subjected to a scientific merit review (peer review). The proposals will be evaluated against the following criteria, which are listed in descending order of importance.

1. Scientific and/or Technical Merit of the Proposed Research
2. Appropriateness of the Proposed Method or Approach
3. Competency of Applicant's Personnel and Adequacy of Proposed Resources
4. Reasonableness and Appropriateness of the Proposed Budget
5. Other Appropriate Factors

The evaluation process will include program policy factors such as the relevance of the proposed research to the terms of the Announcement and the Department's programmatic needs. External peer reviewers are selected with regard to both their scientific expertise and the absence of conflict-of-interest issues. Non-federal reviewers may be used, and submission of a proposal constitutes agreement that this is acceptable to the investigator(s) and the submitting institution.