

# **Program Announcement To DOE National Laboratories LAB 00-08**

## ***Integrated Assessment of Global Climate Change Research***

The Office of Biological and Environmental Research (OBER) of the Office of Science (SC), U.S. Department of Energy (DOE), hereby announces its interest in receiving proposals for the Integrated Assessment of Global Climate Change Program. The program funds research that contributes to integrated assessment of global climate change, including specialized topics to improve specific features. The research program supports the Department's Global Change Research Program, the U.S. Global Change Research Program, and the Administration's goals to understand, model, and assess the effects of increasing greenhouse gas levels in the atmosphere on climate and within that framework to evaluate the options to mitigate the long term rise in greenhouse gases.

Integrated assessment of climate change is defined here as the analysis, including costs and benefits, of climate change from the cause, such as greenhouse gas emissions, through impacts, such as changed energy requirements for space conditioning due to temperature changes. Integrated assessment is sometimes, but not always, implemented as a computer model. A description of integrated assessment may be found in Chapter 10: "Integrated Assessment of Climate Change: An Overview and Comparison of Approaches and Results," in *Climate Change 1995: Economic and Social Dimensions of Climate Change*, edited by Bruce, James P.; Lee, Hoesung; and Haites, Erik F., Cambridge University Press, 1996.

The results of research in integrated assessment of global climate change help the U.S. Global Climate Change Research Program (USGCRP) in several ways. First, this program sponsors research that focuses on the connection of two or more different aspects of the entire analysis of global climate change. This research can lead to insights that would be otherwise unavailable if investigating a more narrowly focused aspect of climate change. Second, results from integrated assessments can be used to highlight high priority research topics for the rest of the USGCRP. A representation of the salient aspects of climate change, from emissions through impacts, is able to provide useful information regarding the degree to which underlying uncertainty in specific topics influence the results. And third, the models may be used outside this research program by the policy community to evaluate specific options. The research described in this announcement provides a foundation so that others may analyze benefits and costs, not necessarily measured monetarily, in a policy context. This research will be judged in part on its potential to improve and/or support the analytical basis for policy development. Policy analysis will not be funded.

The program is narrowly focused and will concentrate support on the topics described below. proposals that involve development of analytical models and computer codes will be judged partly on the basis of proposed tasks to prepare documentation and to make the models and codes available to other groups. The following is a list of topics that are high priority. Topics proposed by principal investigators that fall outside this list will need strong justification.

**A. Technology Innovation and Diffusion.** This category has been a primary focus of the Integrated Assessment of Global Climate Change Program since its inception. The research in

this element is not a stand-alone activity. Its purpose is to fill critical gaps in current integrated assessment modeling.

Assumptions regarding technology innovation and diffusion are one of the most important uncertainties in integrated assessment models, especially for the prediction of greenhouse emissions over long time scales. Making good predictions and being consistent across different modules of the models are crucial to good modeling. The representation of backstop technologies; resource depletion; labor and capital productivity improvements; capital, labor and energy substitutability; and adaptation are all based on technology assumptions. Technology innovation and diffusion affects energy sector consumption and technology characteristics, carbon emissions, economic growth, and many other factors in integrated assessment.

Sometimes it is difficult to identify and separate the driving forces behind the prediction of future changes in activities, particularly greenhouse gas emissions. Information on these driving forces that direct change, such as GDP (gross domestic product), productivity, energy mix, and invention, innovation, and diffusion, are important for integrated assessment. Another way to view technology innovation and diffusion is through three aspects of learning that are relevant to integrated assessment. The first is “learning-by-doing” for manufacturing, or returns to adoption, which reduces the unit cost of manufacturing. The second is “learning-by-using” for consumers, which affects consumer hurdle rates by increasing consumers’ willingness to adopt new technologies. The third is “learning through information”, which affects consumer decisions through information programs.

The rate and nature of technology diffusion from the OECD (Organization for Economic Cooperation and Development) countries to developing countries is not well understood. Predicting economic structural change in those developing countries is also difficult. These issues are important for many reasons. The reasons include the impact on the rest of the world of the invention of new technologies by the OECD countries and the debate on “carbon leakage”, the movement of emissions of greenhouse gases away from relatively regulated countries to relatively unregulated countries.

Other relevant questions include:

Can research and development accelerate the speed with which innovations that would mitigate climate change are moved to the manufacturing production line? What evidence is there of this and what are the relationships between R&D and adoption?

How do innovation and/or diffusion relate to measurable parameters such as public and private research and development investments or regulations?

### **B. Development of Metrics and Measures of Economic Costs of Climate Change Policies.**

There are at least five measures of macro-economic losses that are used to compare climate change policies. These include: (a) the area under a marginal cost curve plus payments for permits, (b) loss in consumption, (c) equivalent variations losses, (d) loss in potential GDP (gross domestic product), and (e) loss in real GDP. These measures are incomplete or flawed under

certain limiting conditions. The purpose of this research would be to describe the pros and cons of these measures and to demonstrate the differences for actual case studies.

**C. Develop Consistent International Data.** Certain data sets are important to collect and distribute to the integrated assessment community so they can be used by several researchers. The focus of this research would be to fill in important integrated assessment data gaps. Past data collection programs funded by this program include improvement of energy sector and usage information, energy quantity flows, fossil fuel resource and reserve estimates, non-market energy sources in developing countries, and carbon dioxide emissions and land use changes by country.

**D. Supply Curves for Non-Carbon Dioxide Greenhouse Gases.** Carbon dioxide provides about two-thirds of the total atmospheric forcing potential of anthropogenic greenhouse gases. The remainder is supplied by such gases as methane, nitrous oxide, and the halocarbons. The emissions scenarios for the other greenhouse gases and particularly the cost of reducing those emissions are much more poorly understood than those for carbon dioxide. This research topic would provide information on global emissions of the other greenhouse gases under business-as-usual scenarios as well as under plausible alternative scenarios that might result from policy actions.

**E. Representation of Anthropogenic Release or Sequestration of Carbon Dioxide Through Land Use Changes and Carbon Sequestration Technologies.** Integrated Assessment models do not represent with desirable accuracy forecasts of carbon dioxide release or sequestration through anthropogenic activities such as land use changes and carbon sequestration. Research in this element is not a stand-alone activity. Proposed research will be judged on the use made by integrated assessment models of the results.

Research is ongoing that will improve our understanding and ability to develop innovative carbon sequestration technologies and procedures that will help reduce levels of carbon dioxide in the atmosphere. Such developments may rely on the continued use of fossil fuels with the sequestration of carbon in the terrestrial biosphere, in underground formations, and in the ocean. New modes of supplying and using substantial amounts of energy, such as hydrogen and fuel cells, may alter future energy and emission parameters substantially. Research in this topic would identify reasonable technology scenarios that will guide the prediction of such integrated assessment scenarios of energy, fossil fuel use, costs, and emissions, in response to various policy options. Research funded under this topic might also develop new information on global carbon dioxide emissions from various land use change and land use management scenarios, including forests and agricultural lands. The emphasis is on global scale estimates, perhaps regionally disaggregated. What potential is there for enhancing carbon dioxide uptake? What changes in the global carbon balance could be expected from policy options?

**F. Representing Adaptation in Integrated Assessment Models.** The emphasis in this research topic is to generate information that will improve the analysis of impacts on most or all of the sectors in an integrated assessment model by including autonomous adaptation in the analysis. Case studies of adaptation for particular sectors, such as agricultural, water resources, or unmanaged ecosystems, may be proposed, but a criterion will be the degree to which the case

study can be generalized to other sectors. The focus of this topic is autonomous adaptation, that is, either adaptation that occurs naturally in, for example, unmanaged ecosystems, or adaptation taken by individuals in response to actual or perceived climate change. The focus is not on non-autonomous adaptation, that is, adaptation that is instigated by government agency. However, research on the effectiveness of possible government-sponsored adaptation may be necessary to understand individual adaptation alternatives.

### **Program Funding**

It is anticipated that up to \$1 million will be available for multiple awards to be made in Fiscal Year 2000 and early Fiscal Year 2001 in the categories described above, contingent on the availability of appropriated funds. proposals may request project support up to three years, with out-year support contingent on the availability of funds, progress of the research, and programmatic needs. Annual budgets are expected to range from \$30,000 to \$150,000 total costs. Funds for this research primarily will come from the Integrated Assessment Research program; some funds may come from the Carbon Management Science program.

### **Collaboration**

Proposers are encouraged to collaborate with researchers in other institutions, such as: universities, industry, non-profit organizations, federal laboratories and Federally Funded Research and Development Centers (FFRDCs), including the DOE National Laboratories, where appropriate, and to include cost sharing and/or consortia wherever feasible. Additional information on collaboration is available in the Application Guide for the Office of Science Financial Assistance Program that is available via the Internet at: <http://www.sc.doe.gov/production/grants/Colab.html>.

### **Preproposals**

A brief preproposal is strongly encouraged but not required prior to submission of a full proposal. The preproposal should identify on the cover sheet the institution, Principal Investigator name, address, telephone, fax and E-mail address, title of the project, and proposed collaborators. The preproposal should consist of a one to two page narrative describing the research project objectives and methods of accomplishment. These will be reviewed relative to the scope and research needs of the Integrated Assessment of Global Climate Change Research Program. Please note that notification of a successful preproposal is not an indication that an award will be made in response to the formal proposal.

**DATES:** Proposers are encouraged (but not required) to submit a brief preproposal for programmatic review. Early submission of preproposals is suggested to allow time for meaningful dialogue.

The deadline for receipt of formal proposals is 4:30 p.m., E.D.T., April 24, 2000, to be accepted for merit review and to permit timely consideration for award in Fiscal Year 2000 and early Fiscal Year 2001.

**ADDRESSES:** Preproposals, referencing Program Announcement LAB 00-08, should be sent E-mail to [john.houghton@science.doe.gov](mailto:john.houghton@science.doe.gov).

Formal proposals, referencing Program Announcement LAB 00-08, should be sent to: U.S. Department of Energy, Office of Science, Environmental Sciences Division, SC-74, 19901 Germantown Road, Germantown, MD 20874-1290, ATTN: Program Announcement LAB 00-08. This address must also be used when submitting proposals by U.S. Postal Service Express Mail or any other commercial overnight delivery service, or when hand-carried by the proposer.

**FOR FURTHER INFORMATION CONTACT:** Dr. John Houghton, Environmental Sciences Division, SC-74, Office of Biological and Environmental Research, Office of Science, U.S. Department of Energy, 19901 Germantown Road, Germantown, MD 20874-1290, telephone: (301) 903-8288, E-mail: [john.houghton@science.doe.gov](mailto:john.houghton@science.doe.gov), fax: (301) 903-8519.

Although the required original and seven copies of the proposal must be submitted, researchers are asked to submit an electronic version of their abstract of the proposed research in ASCII format and their E-mail address to Karen Carlson by E-mail at [karen.carlson@science.doe.gov](mailto:karen.carlson@science.doe.gov).

**RELATED FUNDING OPPORTUNITIES:** Investigators may wish to obtain information about the following related funding opportunities:

**National Oceanic and Atmospheric Administration:** Within the context of its Human Dimensions of Global Change Research Program, the Office of Global Programs of the National Oceanic and Atmospheric Administration will support research that identifies and analyzes how social and economic systems are currently influenced by fluctuations in climate, and how human behavior can be (or why it may not be) affected based on information about variability in the climate system. The program is particularly interested in learning how advanced climate information on seasonal to yearly time scales, as well as an improved understanding of current coping mechanisms, could be used for reducing vulnerability and providing for more efficient adjustment to these variations. Notice of this program is included in the Program Announcement for NOAA's Climate and Global Change Program, which is published each spring in the Federal Register. The deadline for proposals to be considered in Fiscal Year 2001 is expected to be in late summer 2000. For further information, contact: Caitlin Simpson; Office of Global Programs; National Oceanic and Atmospheric Administration; 1100 Wayne Ave., Suite 1225; Silver Spring, MD 20910; telephone: (301) 427-2089, ext. 152; Internet: [simpson@ogp.noaa.gov](mailto:simpson@ogp.noaa.gov).

The instructions and format described below should be followed. Reference Program Announcement LAB 00-08 on all submissions and inquiries about this program.

**OFFICE OF SCIENCE  
GUIDE FOR PREPARATION OF SCIENTIFIC/TECHNICAL PROPOSALS  
TO BE SUBMITTED BY NATIONAL LABORATORIES**

Proposals from National Laboratories submitted to the Office of Science (SC) as a result of this program announcement will follow the Department of Energy Field Work Proposal process with additional information requested to allow for scientific/technical merit review. The following

guidelines for content and format are intended to facilitate an understanding of the requirements necessary for SC to conduct a merit review of a proposal. Please follow the guidelines carefully, as deviations could be cause for declination of a proposal without merit review.

## **1. Evaluation Criteria**

Proposals will be subjected to formal merit review (peer review) and will be evaluated against the following criteria which are listed in descending order of importance:

Scientific and/or technical merit of the project

Appropriateness of the proposed method or approach

Competency of the personnel and adequacy of the proposed resources

Reasonableness and appropriateness of the proposed budget

The evaluation will include program policy factors such as the relevance of the proposed research to the terms of the announcement, the uniqueness of the proposer's capabilities, and demonstrated usefulness of the research for proposals in other DOE Program Offices as evidenced by a history of programmatic support directly related to the proposed work.

## **2. Summary of Proposal Contents**

Field Work Proposal (FWP) Format (Reference DOE Order 5700.7C) (DOE ONLY)

Proposal Cover Page

Table of Contents

Abstract

Narrative

Literature Cited

Budget and Budget Explanation

Other support of investigators

Biographical Sketches

Description of facilities and resources

Appendix

### **2.1 Number of Copies to Submit**

An original and seven copies of the formal proposal/FWP must be submitted.

## **3. Detailed Contents of the Proposal**

Proposals must be readily legible, when photocopied, and must conform to the following three requirements: the height of the letters must be no smaller than 10 point with at least 2 points of spacing between lines (leading); the type density must average no more than 17 characters per inch; the margins must be at least one-half inch on all sides. Figures, charts, tables, figure

legends, etc., may include type smaller than these requirements so long as they are still fully legible.

### **3.1 Field Work Proposal Format (Reference DOE Order 5700.7C)** (DOE ONLY)

The Field Work Proposal (FWP) is to be prepared and submitted consistent with policies of the investigator's laboratory and the local DOE Operations Office. Additional information is also requested to allow for scientific/technical merit review.

Laboratories may submit proposals directly to the SC Program office listed above. A copy should also be provided to the appropriate DOE operations office.

### **3.2 Proposal Cover Page**

The following proposal cover page information may be placed on plain paper. No form is required.

Title of proposed project  
SC Program announcement title  
Name of laboratory  
Name of principal investigator (PI)  
Position title of PI  
Mailing address of PI  
Telephone of PI  
Fax number of PI  
Electronic mail address of PI  
Name of official signing for laboratory\*  
Title of official  
Fax number of official  
Telephone of official  
Electronic mail address of official  
Requested funding for each year; total request  
Use of human subjects in proposed project:  
    If activities involving human subjects are not planned at any time during the proposed project period, state "No"; otherwise state "Yes", provide the IRB Approval date and Assurance of Compliance Number and include all necessary information with the proposal should human subjects be involved.  
Use of vertebrate animals in proposed project:  
    If activities involving vertebrate animals are not planned at any time during this project, state "No"; otherwise state "Yes" and provide the IACUC Approval date and Animal Welfare Assurance number from NIH and include all necessary information with the proposal.  
Signature of PI, date of signature  
Signature of official, date of signature\*

\*The signature certifies that personnel and facilities are available as stated in the proposal, if the project is funded.

### 3.3 Table of Contents

Provide the initial page number for each of the sections of the proposal. Number pages consecutively at the bottom of each page throughout the proposal. Start each major section at the top of a new page. Do not use unnumbered pages and do not use suffices, such as 5a, 5b.

### 3.4 Abstract

Provide an abstract of no more than 250 words. Give the broad, long-term objectives and what the specific research proposed is intended to accomplish. State the hypotheses to be tested. Indicate how the proposed research addresses the SC scientific/technical area specifically described in this announcement.

### 3.5 Narrative

The narrative comprises the research plan for the project and is limited to 25 pages. It should contain the following subsections:

**Background and Significance:** Briefly sketch the background leading to the present proposal, critically evaluate existing knowledge, and specifically identify the gaps which the project is intended to fill. State concisely the importance of the research described in the proposal. Explain the relevance of the project to the research needs identified by the Office of Science. Include references to relevant published literature, both to work of the investigators and to work done by other researchers.

**Preliminary Studies:** Use this section to provide an account of any preliminary studies that may be pertinent to the proposal. Include any other information that will help to establish the experience and competence of the investigators to pursue the proposed project. References to appropriate publications and manuscripts submitted or accepted for publication may be included.

**Research Design and Methods:** Describe the research design and the procedures to be used to accomplish the specific aims of the project. Describe new techniques and methodologies and explain the advantages over existing techniques and methodologies. As part of this section, provide a tentative sequence or timetable for the project.

**Subcontract or Consortium Arrangements:** If any portion of the project described under "Research Design and Methods" is to be done in collaboration with another institution, provide information on the institution and why it is to do the specific component of the project. Further information on any such arrangements is to be given in the sections "Budget and Budget Explanation", "Biographical Sketches", and "Description of Facilities and Resources".

### 3.6 Literature Cited

List all references cited in the narrative. Limit citations to current literature relevant to the proposed research. Information about each reference should be sufficient for it to be located by a reviewer of the proposal.

### **3.7 Budget and Budget Explanation**

A detailed budget is required for the entire project period, which normally will be three years, and for each fiscal year. It is preferred that DOE's budget page, Form 4620.1 be used for providing budget information\*. Modifications of categories are permissible to comply with institutional practices, for example with regard to overhead costs.

A written justification of each budget item is to follow the budget pages. For personnel this should take the form of a one-sentence statement of the role of the person in the project. Provide a detailed justification of the need for each item of permanent equipment. Explain each of the other direct costs in sufficient detail for reviewers to be able to judge the appropriateness of the amount requested.

Further instructions regarding the budget are given in section 4 of this guide.

\* Form 4620.1 is available at web site: <http://www.sc.doe.gov/production/grants/forms.html>

### **3.8 Other Support of Investigators**

Other support is defined as all financial resources, whether Federal, non-Federal, commercial or institutional, available in direct support of an individual's research endeavors. Information on active and pending other support is required for all senior personnel, including investigators at collaborating institutions to be funded by a subcontract. For each item of other support, give the organization or agency, inclusive dates of the project or proposed project, annual funding, and level of effort devoted to the project.

### **3.9 Biographical Sketches**

This information is required for senior personnel at the laboratory submitting the proposal and at all subcontracting institutions. The biographical sketch is limited to a maximum of two pages for each investigator.

### **3.10 Description of Facilities and Resources**

Describe briefly the facilities to be used for the conduct of the proposed research. Indicate the performance sites and describe pertinent capabilities, including support facilities (such as machine shops) that will be used during the project. List the most important equipment items already available for the project and their pertinent capabilities. Include this information for each subcontracting institution, if any.

### **3.11 Appendix**

Include collated sets of all appendix materials with each copy of the proposal. Do not use the appendix to circumvent the page limitations of the proposal. Information should be included that may not be easily accessible to a reviewer.

Reviewers are not required to consider information in the Appendix, only that in the body of the proposal. Reviewers may not have time to read extensive appendix materials with the same care as they will read the proposal proper.

The appendix may contain the following items: up to five publications, manuscripts (accepted for publication), abstracts, patents, or other printed materials directly relevant to this project, but not generally available to the scientific community; and letters from investigators at other institutions stating their agreement to participate in the project (do not include letters of endorsement of the project).

#### **4. Detailed Instructions for the Budget**

(DOE Form 4620.1 "Budget Page" may be used)

##### **4.1 Salaries and Wages**

List the names of the principal investigator and other key personnel and the estimated number of person-months for which DOE funding is requested. Proposers should list the number of postdoctoral associates and other professional positions included in the proposal and indicate the number of full-time-equivalent (FTE) person-months and rate of pay (hourly, monthly or annually). For graduate and undergraduate students and all other personnel categories such as secretarial, clerical, technical, etc., show the total number of people needed in each job title and total salaries needed. Salaries requested must be consistent with the institution's regular practices. The budget explanation should define concisely the role of each position in the overall project.

##### **4.2 Equipment**

DOE defines equipment as "an item of tangible personal property that has a useful life of more than two years and an acquisition cost of \$5000 or more." Special purpose equipment means equipment which is used only for research, scientific or other technical activities. Items of needed equipment should be individually listed by description and estimated cost, including tax, and adequately justified. Allowable items ordinarily will be limited to scientific equipment that is not already available for the conduct of the work. General purpose office equipment normally will not be considered eligible for support.

##### **4.3 Domestic Travel**

The type and extent of travel and its relation to the research should be specified. Funds may be requested for attendance at meetings and conferences, other travel associated with the work and subsistence. In order to qualify for support, attendance at meetings or conferences must enhance the investigator's capability to perform the research, plan extensions of it, or disseminate its results. Consultant's travel costs also may be requested.

#### **4.4 Foreign Travel**

Foreign travel is any travel outside Canada and the United States and its territories and possessions. Foreign travel may be approved only if it is directly related to project objectives.

#### **4.5 Other Direct Costs**

The budget should itemize other anticipated direct costs not included under the headings above, including materials and supplies, publication costs, computer services, and consultant services (which are discussed below). Other examples are: aircraft rental, space rental at research establishments away from the institution, minor building alterations, service charges, and fabrication of equipment or systems not available off-the-shelf. Reference books and periodicals may be charged to the project only if they are specifically related to the research.

##### **a. Materials and Supplies**

The budget should indicate in general terms the type of required expendable materials and supplies with their estimated costs. The breakdown should be more detailed when the cost is substantial.

##### **b. Publication Costs/Page Charges**

The budget may request funds for the costs of preparing and publishing the results of research, including costs of reports, reprints page charges, or other journal costs (except costs for prior or early publication), and necessary illustrations.

##### **c. Consultant Services**

Anticipated consultant services should be justified and information furnished on each individual's expertise, primary organizational affiliation, daily compensation rate and number of days expected service. Consultant's travel costs should be listed separately under travel in the budget.

##### **d. Computer Services**

The cost of computer services, including computer-based retrieval of scientific and technical information, may be requested. A justification based on the established computer service rates should be included.

##### **e. Subcontracts**

Subcontracts should be listed so that they can be properly evaluated. There should be an anticipated cost and an explanation of that cost for each subcontract. The total amount of each subcontract should also appear as a budget item.

#### **4.6 Indirect Costs**

Explain the basis for each overhead and indirect cost. Include the current rates.