

# Program Announcement To DOE National Laboratories LAB 02-22

## *Integrated Assessment of 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 interest in receiving proposals for the Integrated Assessment of Climate Change Research Program. This notice is a follow on to previous notices published in the Federal Register. The program funds research that contributes to integrated assessment of climate change, and in particular, research to develop and improve methods and tools that focus on specialized topics of importance to integrated assessments. The research program supports the Administration's Climate Change Research activities and the U.S. Global Change Research Program goals to understand, model, and assess the effects of increasing greenhouse gas concentrations in the atmosphere. The program supports research to evaluate the economic costs and predicted responses to options that would mitigate the long-term increase in carbon dioxide and other greenhouse gases.

**SUPPLEMENTARY INFORMATION:** An integrated assessment of climate change is defined here as the analysis of the human (including economics), physical, and biological aspects of climate change from the cause, such as greenhouse gas emissions, through impacts, such as changes to unmanaged ecosystems, sea level rise, and altered growing conditions for crops. The primary emphasis is to represent all three aspects in such a way that actions to mitigate climate change may be evaluated. Integrated assessments are commonly based on predictions using a computer model.

A description of integrated assessment may be found in volume 3 of the report "Intergovernmental Panel on Climate Change (IPCC) Third Assessment Report: Climate Change 2001". The reference is: Ferenc Toth, Mark Mwandosya, John Christiansen, Jae Edmonds, Brian Flannery, Carlos Gay-Garcia, Hoesung Lee, Klaus Meyer-Abich, Elena Nikitina, Atiq Rahman, Richard Richels, Ye Riqui, Arturo Villavicencio, Yoko Wake, and John Weyant, "Decision-Making Frameworks," Chapter 10 in Climate Change 2001: Mitigation, Cambridge University Press, 2001, (<http://www.ipcc.ch/pub/reports.htm>). A Special Issue of The Energy Journal entitled "The Costs of the Kyoto Protocol: A Multi-Model Evaluation", 1999, [ISSN 0195-6574] presents analyses from several integrated assessment models of predicted costs to meet various target emission scenarios. The web site for the Energy Modeling Forum (<http://www.stanford.edu/group/EMF/home/index.htm>) contains further background information.

The policy community uses integrated assessment models to evaluate specific policy options. This notice solicits research intended to provide a sound scientific foundation for predicting and analyzing benefits and costs of climate change, and possible policy options to mitigate it, some of which are not measured monetarily. The research funded as a result of this solicitation will be

judged in part on its potential to develop and improve methods and models needed to support policy development. Policy analysis itself will not be funded.

The program 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 whether they include proposed tasks to document and make the models and model codes available to the community. 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 to be considered for funding. Research projects in these elements are intended to fill critical gaps in current integrated assessments.

**A. Technology Innovation and Diffusion.** This is a primary focus of the Integrated Assessment of Climate Change Research Program. Assumptions regarding technology innovation and diffusion are some of the most important contributors to overall uncertainty in predicting future emissions of greenhouse gases. A key area of interest is research to improve the ability of the integrated assessment models to represent technological change as a function of variables that are determined by the model ("endogenizing technological change") rather than postulated as static input to the model.

One particular difficulty in modeling technological change is in representing the penetration of new technologies. Over the 21st century, the typical timeframe of the integrated assessment models, technologies need to be invented, innovated upon, and diffused to the sectors in which they are used. Several questions need to be addressed, such as: How rapidly do these technological changes take place? What influences the rates? If the model assigns a price for a new technology that is lower than competing technologies, how should the dynamic adoption of the technology be modeled? What can be learned from historical precedents that would lead to better understanding of the processes and therefore to better modeling?

The rate and nature of technology diffusion from the more-developed nations to developing nations is not well understood. Predicting economic structural change in developing nations is also problematical. Much of the uncertainty in integrated assessment models comes from the difficulty in predicting the response of the energy sector and greenhouse gas emissions in developing nations to both regulation and technological innovations in more-developed nations. How can historical precedents be used to understand and model the future movement of technologies across national borders?

This research will help provide tools to address other policy-relevant questions such as the following, as they relate to greenhouse gas emissions:

What effect would various policy options have on "carbon leakage", the movement of emissions of greenhouse gases away from nations with relatively regulated emissions to ones with relatively unregulated emissions?

How can the impact of research and development on invention, innovation, and adoption be simulated and modeled quantitatively?

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

**B. Evaluation of Scenarios Used to Drive Integrated Assessment Models.** The Intergovernmental Panel on Climate Change recently published a Special Report on Emission Scenarios (SRES) (<http://www.ipcc.ch/pub/reports.htm#sprep>). These scenarios describe various possible directions for future development and are used as input into the Integrated Assessment models. The scenarios include projections of economic growth, population dynamics, and technology development that vary by time and locale.

This notice solicits research to evaluate the existing SRES scenarios. Some combinations of values, for instance high per capita income growth and high population growth, are less likely than other combinations. Research should investigate which combinations of values are important enough to be represented by a particular scenario. The research would investigate whether the scenarios selected by the SRES adequately represent the underlying uncertainty. Would it be beneficial to add scenarios or is it possible to reduce the number? Research into demography per se, such as population dynamics and predictions of age distribution, is not being solicited. The research proposed under this topic should rely primarily on existing demographic data and evaluate that data in the context of demographic scenarios used in integrated assessment.

**DATES:** Researchers 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., May 14, 2002, to be accepted for merit review and to permit timely consideration for award in Fiscal Year 2002 and early Fiscal Year 2003.

**ADDRESSES:** Preproposals, referencing Program Announcement LAB 02-22, should be sent E-mail to [john.houghton@science.doe.gov](mailto:john.houghton@science.doe.gov).

Formal proposals, referencing Program Announcement LAB 02-22, should be sent to: U.S. Department of Energy, Office of Science, Environmental Sciences Division, SC-74, Office of Biological and Environmental Research, 19901 Germantown Road, Germantown, MD 20874-1290, ATTN: Program Announcement LAB 02-22. 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 researcher.

**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.

**Program Funding**

It is anticipated that up to \$1,000,000 will be available for multiple awards to be made in Fiscal Year 2002 and early Fiscal Year 2003 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 will come from the Integrated Assessment Research program.

### **Collaboration**

Researchers 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 World Wide Web at: <http://www.science.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 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.

### **Submission Information**

Researchers are expected to follow instructions in the Office of Science Guide for Preparation of Scientific/Technical Proposals to be Submitted by National Laboratories (attached below). DOE is under no obligation to pay for any costs associated with the preparation or submission of proposals if an award is not made.

The research project description must be 15 pages or less, exclusive of attachments and must contain an abstract or summary of the proposed research. All collaborators should be listed with the abstract or summary. On the cover page also provide the PI's phone number, fax number, and E-mail address. Attachments include curriculum vitae, a listing of all current and pending federal support and letters of intent when collaborations are part of the proposed research. Curriculum vitae should be submitted in a form similar to that of NIH or NSF (two to three pages), see for example: <http://www.nsf.gov/bfa/cpo/gpg/fkit.htm#forms-9>.

The instructions and format described below should be followed. Reference Program Announcement LAB 02-22 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 \$25,000 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.