Office of Science
Notice 01-22

Integrated Assessment of Global Climate Change Research

Department of Energy
Office of Science

Office of Science Financial Assistance Program Notice 01-22; Integrated Assessment of Global Climate Change Research

AGENCY: U. S. Department of Energy (DOE)

ACTION: Notice inviting grant applications.

SUMMARY: 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 applications for the Integrated Assessment of Global Climate Change Program. This notice is a follow on to six previous notices published in the Federal Register. The program funds research that contributes to integrated assessment of global climate change, in particular, research to develop and improve methods and tools that focus on specialized topics of special importance to integrated assessments. 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 and within that framework to evaluate the economic costs and predicted responses to options that would mitigate the long term rise in greenhouse gases.

DATES: Applicants are encouraged (but not required) to submit a brief preapplication for programmatic review. Early submission of preapplications is suggested to allow time for meaningful dialogue.

The deadline for receipt of formal applications is 4:30 p.m., E.D.T., April 3, 2001, to be accepted for merit review and to permit timely consideration for award in Fiscal Year 2001 and early Fiscal Year 2002.

ADDRESSES: Preapplications, referencing Program Notice 01-22, should be sent E-mail to john.houghton@science.doe.gov.

Formal applications, referencing Program Notice 01-22, should be sent to: U.S. Department of Energy, Office of Science, Grants and Contracts Division, SC-64,

19901 Germantown Road, Germantown, MD 20874-1290, ATTN: Program Notice 01-22. This address must also be used when submitting applications by U.S. Postal Service Express Mail or any other commercial overnight delivery service, or when hand-carried by the applicant.

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, fax: (301) 903-8519. The full text of Program Notice 01-22 is available via the World Wide Web using the following web site address: http://www.sc.doe.gov/production/grants/grants.html.

SUPPLEMENTARY INFORMATION: Integrated assessment of global climate change is defined here as the analysis, including costs and benefits, of the consequences of climate change and the actions to mitigate it from the cause, such as greenhouse gas emissions, through impacts, such as altered hydrologic regimes and 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. A Special Issue of The Energy Journal entitled "The Costs of the Kyoto Protocol: A Multi-Model Evaluation", 1999, presents analyses from several integrated assessment models of predicted costs to meet various target emission scenarios. The Pew Center for Global Climate Change posts a collection of papers on the economics of global climate change at http://www.pewclimate.org/projects/ that reflect some of the research results supported by this program. The web site for the Energy Modeling Forum (http://www.stanford.edu/group/EMF/home/index.htm) contains further background information.

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, the integrated assessment models may be used outside the USGCRP by the policy community to evaluate specific options. The research described in this notice is intended to provide a sound scientific foundation for analyzing benefits and costs, some of which are not necessarily measured monetarily. The research supported as a result of this solicitation 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. Second, results from integrated assessments can be used to identify high priority research needs of 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, this program sponsors research on selected topics that focus 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.

The program is narrowly focused and will concentrate support on the topics described below. Applications 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 the effects of technology innovation and diffusion of greenhouse gas emissions are some of the most important contributors to uncertainty in integrated assessment models 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.

There is a need to identify and separate the driving forces behind the prediction of future changes in greenhouse gas emissions. Information on the driving forces, such as GDP (gross domestic product), productivity, energy mix, and invention, innovation, and diffusion are important for integrated assessment. The improvement in 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") is a key thrust.

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 developing countries 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 countries to both regulation and technological innovations in OECD nations. How should integrated assessment models treat the transfer of technology from OECD countries to developing countries?

This research would 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 relatively regulated countries to relatively unregulated countries?
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> How can research and development accelerate the speed of moving innovations that would mitigate climate change to the manufacturing production line? How can the linkages and connections between R&D and manufacturing efficiency, 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. 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 projects funded by this program include a) providing an energy quantity flow data base and assembling fossil fuel resource estimates compatible with the GTAP data base, b) statistics on non-market energy sources in developing countries, and c) carbon dioxide emissions and land use changes by country.

C. 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 results from such gases as methane, nitrous oxide, and the halocarbons. The emission 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 costs of reducing emissions of the other greenhouse gases under business-as-usual scenarios as well as under plausible policy actions.

D. 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 basis of the potential utility of these research results in integrated assessment models.

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. Research in this topic would identify and quantify the costs and likely responses to various carbon sequestration policy options, in a way that can be adopted by the integrated assessment models. 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 sequestration? What changes in the global carbon balance could be expected from policy options to enhance sequestration?

Program Funding

It is anticipated that up to $800,000 will be available for multiple awards to be made in Fiscal Year 2001 and early Fiscal Year 2002 in the categories described above, contingent on the availability of appropriated funds. Applications 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 for research on Topic D will come from the Carbon Management Science program.

Collaboration

Applicants 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.sc.doe.gov/production/grants/Colab.html.

Preapplications

A brief preapplication is strongly encouraged but not required prior to submission of a full application. The preapplication 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 preapplication 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 preapplication is not an indication that an award will be made in response to the formal application.

Merit Review

Applications will be subjected to scientific merit review (peer review) and will be evaluated against the following evaluation criteria listed in descending order of importance as codified at 10 CFR 605.10(d):

1. Scientific and/or Technical Merit of the Project,
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.

The evaluation will include program policy factors such as the relevance of the proposed research to the terms of the announcement and the agency's programmatic needs. Note, 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 an application constitutes agreement that this is acceptable to the investigator(s) and the submitting institution.

Information about the development and submission of applications, eligibility, limitations, evaluation, selection process, and other policies and procedures may be found in 10 CFR Part 605, and in the Application Guide for the Office of Science Financial Assistance Program. Electronic access to the Guide and required forms is made available via the World Wide Web at:
http://www.sc.doe.gov/production/grants/grants.html. DOE is under no obligation to pay for any costs associated with the preparation or submission of applications 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 grant face page, form DOE F 4650.2, in block 15, 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.

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 2002 is expected to be in late summer 2001. 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.

National Science Foundation: Starting in FY 2001, NSF will support research and related activities associated with the dynamics of coupled natural and human systems through its Biocomplexity special competition. The Biocomplexity 2001 announcement can be accessed at http://www.nsf.gov/cgi-bin/getpub?nsf0134. The deadline for submission of proposals for the FY 2001 competition is March 16, 2001. NSF staff expect the competition to continue in future fiscal years, although deadlines may be earlier in the fiscal year and the focus may change somewhat. Potential applicants should regularly consult the NSF Web site for updates.

The Catalog of Federal Domestic Assistance Number for this program is 81.049, and the solicitation control number is ERFAP 10 CFR Part 605.

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for Resource Management

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