

Request for Pre-proposals

California Regional Climate Change Economic Impact and Adaptation Study: Coastal Impacts

Background information

Executive Order # S-3-05, signed by Governor Schwarzenegger on June 1, 2005, requires that the Secretary of the California Environmental Protection Agency (CalEPA) prepare biennial science reports on the “impacts to California of global warming, including impacts to water supply, public health, agriculture, the coastline, and forestry, and... on mitigation and adaptation plans to combat these impacts.” The Secretary must submit these reports to the Governor and the State Legislature. CalEPA released the first biennial report in March 2006¹, and the second will be released at the end of 2008.

CalEPA has stipulated that, to the degree feasible, economic implications of the climatic scenarios must be included in the 2008 report. Through the PIER program the Energy Commission has funded sector economic impact studies in the past. The 2003 PIER report entitled “Global Climate Change and California: Potential Implications for Ecosystems, Health, and the Economy” contained such analyses². Additional reports posted after the release of the 2006 scenarios address economic impacts, although the results should be considered preliminary³.

Overall Research Strategy for the 2008 Scenarios Report

In addition to adding sector based economic components to the different studies, we propose to enhance the earlier work in two important ways. First, the 2008 report will examine climate impacts within the context of broader social changes, such as land use change and demographic shifts. This is an important extension because such factors are likely to be important in determining the character and severity of impacts highlighted in the 2006 assessment, including their economic costs. Enlarging the knowledge base on the interactions between these and other drivers will be essential both in assessing the costs of inaction and in designing adaptation strategies. Secondly, the 2008 report will incorporate improved modeling results on biophysical and biological impacts for estimating economic impacts in key sectors.

Some of the on-going research funded through the PIER program and the Air Resources Board will also be used for the 2008 report. Examples of PIER-sponsored research include use of two new climate downscaling techniques developed by the Scripps Institute of Oceanography, a new dynamic ecological model being developed for PIER by Conservation International, and the results of a new study on high temperatures and human morbidity and mortality being conducted by researchers associated with the

¹ http://www.climatechange.ca.gov/biennial_reports/2006report/index.html

² http://www.energy.ca.gov/pier/final_project_reports/500-03-058cf.html

³ http://www.climatechange.ca.gov/documents/pier_gcc_reports.html

Office of Environmental Health Hazard Assessment (OEHHA) and the Harvard University. ARB will also contribute with on-going studies on climate change and air quality.

Request for Pre--proposals

The Public Interest Energy Research (PIER) Program is seeking pre-proposals to conduct an economic impact and adaptation study on the effect of climate change on coastal related issues in California.

The selected research group will utilize the climate change and sea level rise scenarios to be developed by Scripps Institution of Oceanography. The selected researchers should also use the new California socio-economic scenarios that will be developed as part of the Scenarios Project and potentially, new geographical information system (GIS) projections of changing land use patterns.

The pre-proposal should discuss how the proposed research would address adaptation strategies related to coastal areas and their implications for climate change-related economic impacts. This could include estimating costs and outcomes of R&D that would be needed to ameliorate these impacts. The pre-proposal should also describe how the researchers plan to explore different strategies to deal with changes in extreme events (storm surges, etc.). Thought should be given to the link between land use planning and coastal impacts as well as indirect effects associated with coastal protection. Modeling efforts should include, to the extent possible, realistic descriptions of appropriate institutional actors and variability across economic sectors and geographical areas. Monetizing potential the effects due to changes in coastal ecosystems should also be considered.

The pre-proposals should, at a conceptual level, indicate how the researchers would be able to apply, complement, or extend the results of several closely related studies. The chosen research group will be required, to the extent possible, to ensure consistency between their work and several related studies funded by PIER. The following relevant on-going or upcoming studies will need to be considered:

- 1) *Identification of coastal hot-spots to sea level rise.* Drs. P. Adams and D. Inman will utilize the SWAN model to explore hotspots of coastal erosion. This study will link beach erosion with a series of given wave conditions, most likely focusing on Southern California.
- 2) *Vulnerability of the San Francisco Bay Delta to Inundation.* Drs. N. Knowles, M. Dettinger and D. Cayan will enhance prior work on the inundation of the San Francisco Bay Delta Region associated with sea level changes. The upcoming study will examine the combined effects of sea level rise and fresh water flood flow from Sierra watersheds.

- 3) *Economic costs due to sea level rise for the San Francisco Bay.* The Pacific Institute will be in charge of updating a study that they performed several years ago about the economic costs associated with sea level rise for the San Francisco Bay.⁴ They will also explore coping/adaptation strategies.
- 4) *Climate change impacts on the San Francisco Bay Delta.* A study funded by the California Department of Water Resources is examining the potential collapse of the Delta levee system. The U.S. Geological Survey is conducting a study of the effects of climate change on the Delta. To the extent possible the results of this research should be incorporated into the analysis of economic impacts.

The final product of the chosen research project will be a high quality technical manuscript. PIER and CalEPA will implement a stringent quality peer-review process and only the papers that pass this review will be released. It is most likely that the authors will be invited to submit their papers for consideration for publication in a peer-reviewed scientific journal. PIER will not cover the costs associated with the review or revision of papers that may be required for journal publication.

Instructions for the Pre-proposal

The pre-proposal should be prepared as follows:

- The proposal should not be more than five pages long, excluding the pages needed for the references, budget, and information about the qualifications of the research team.
- The proposal shall include a one page preliminary budget. Researchers associated with the University of California should use a 25 percent overhead rate.
- The proposal shall include a short description about the qualifications of the research team highlighting relevant papers published in the peer-reviewed literature
- The pre-proposal should be submitted via e-mail to Guido Franco (gfranco@energy.state.ca.us) and Alan Sanstad (ahsanstad@lbl.gov). Contact them if you do not receive an e-mail from them confirming receiving your pre-proposal three working days after the submissions of your pre-proposal.
- All the pre-proposals must be submitted via e-mail by June 7, 2007.

Selection Process

A group selected by CalEPA and PIER will be in charge of scoring and recommending the pre-proposal(s). PIER will follow the process established for the selection of single source awards (http://www.energy.ca.gov/contracts/pier_program_files/pier_sole_single_source.html).

⁴ Gleick, P.H. and E.P. Maurer. 1990. "Assessing the costs of adapting to sea-level rise: A case study of San Francisco Bay." Pacific Institute for Studies in Development, Environment, and Security, Berkeley, California and the Stockholm Environment Institute, Stockholm, Sweden. 57 pp. with 2 maps.

PIER and CalEPA will select one of the pre-proposals and work with the applicant to refine their pre-proposal as needed. PIER and CalEPA will have the option to work with a different group if a final agreement on the scope of work cannot be reached.

The Office of Sponsored Projects at the universities or the appropriate individual or group for the selected proposal will need to submit the official final proposal to PIER. Please note that the pre-proposals submitted as part of this call may come directly from the researchers. However, it is strongly suggested that the researchers consult with their accounting and contracts groups to make sure the draft budgets are reasonable and in accord with institutional requirements.

Additional Information

It is necessary that the chosen research group understand the importance of having open lines of communication with other related Scenarios Project researchers in order to ensure consistency in the final research reports. After the contracts for the Scenarios Project are in place, PIER will organize a meeting for all the researchers involved in the chosen project to make sure the overall work is well coordinated. In person participation for all the principal investigators will be mandatory. There will be also at least two more meetings per year with the groups working on coastal impacts issues and perhaps one per year with the other groups. To the extent feasible participation by phone or via WebEx ® will be available. Several conference calls may be also necessary during the execution of the project. Approximately three public meetings would take place during the execution of this project to present the research plan and preliminary and final results to stakeholders.

The principal investigator may be invited to present preliminary and/or final findings at the annual conferences organized by PIER and co-sponsored by CalEPA.

The total maximum amount of funds available for this study is \$70,000. Preliminary research results must be submitted for informal review in May 2008. The vast majority of the work including the preparation of the draft final manuscript must be done by the end of the summer of 2008 but the contract would most likely expire early in 2009.

Attachment

Brief Summary of Past Economic Coastal Impact and Adaptation Studies.

The potential effects of climate change on coastal areas, in various countries and regions, have received much recent attention in the literature. Variability in costs and benefits has been noted as a function of model methodology, data sets utilized, spatial location etc. This uncertainty, as well as the importance of coastal impacts to several heavily populated areas in the state, necessitates a greater understanding of economics of coastal impacts due to a changing climate.

The following are two studies on coastal impacts in California:

Dr. Dan Cayan et al. developed relatively detailed sea level rise scenarios for the San Francisco coastal region (Cayan, 2006). Gradual sea level rise would result in potentially large impacts due to changes in storm surges and associated wave activity. The predicted increase in occurrence of extreme events accompanying sea level rise would result in potentially serious impacts for coastal communities. There may also be increased risks of Delta levee failure.

An earlier study of the economic effects climate change determined that low lying areas would be particularly vulnerable to rising sea levels (Newman et al., 2003). The undiscounted costs of sea level rise over the next 100 years were approximately \$700 million for a 50 cm rise and \$4.7 billion for a 1 m rise. It is important to note that this study only looked at the effect of the rising sea level itself and did not explore costs associated with coastal storms and other effects.

References

- Cayan, D., P. Bromirski, K. Hayhoe, M. Tyree, M. Dettinger and R. Flick. (2006). Projecting Future Sea Level. Pub. # CEC-500-2005-202-SF.
www.energy.ca.gov/2005publications/CEC-500-2005-202/CEC-500-2005-202-SF.PDF
- Newman, J. E., et al. Market Impacts of Sea Level Rise on California Coasts. Appendix XIII in Wilson et al. 2003. Global Climate Change and California: Potential Implications for Ecosystems, Health, and the Economy.
http://www.energy.ca.gov/pier/final_project_reports/500-03-058cf.html