

**SAB Research Budget Work Group Meeting - Economics and Decision Sciences and  
National Center for Environmental Economics Programs**

March 1, 2012

EDS Program Overview

Prior to FY08, ORD's National Center for Environmental Research (NCER) was responsible for administering and funding the Economics and Decision Science (EDS) program. The program was moved in FY2008 from NCER to the Office of Policy (OP) under the Regulatory/Econ Management and Analysis program project, and thirty-eight (38) active grants were moved from NCER to NCEE at this time.

When the EDS program moved funding was cut by 50% (new baseline budget of \$1 million) and was cut again due to 40 percent OP-wide cut. OP also absorbed a substantial cut in the FY09 continuing resolution, resulting in no new obligations of funds in FY08 and FY09. As a result of new priorities and a better budget picture for OP, the EDS research program saw an increase that enabled the program to fund \$1.0M in grants FY2010, and continue this into FY2011 under the President's Budget.

The following table provides an overview of the funding and FTE for the EDS program since FY07, along with NCEE funding provided for our own competitive solicitations for grants. NCEE staff members also conduct research directly, sometimes supported by contracted efforts, but these are not included here.

Fiscal Yr Program	2007	2008	2009	2010	2011	2012 (estimate)	2013 (estimate)
EDS	2.3M	-	-	1.2M	0.5M	-	1.0M
NCEE	0.2M	0.7M	0.2M	0.6M	1.9M	TBD	2.0M
Total	2.5M	0.7M	0.2M	1.8M	2.4M	TBD	3.0M

The increase in the EDS program from no funding in 2009 to the sending levels in FY10 (\$1.2M) and 2011 (\$0.5M) enabled the office to finance the outcome of solicitations issued over the 2007-2010 period that were primarily designed at supporting workshops or new research, including a series small grants supporting dissertation/early career research projects. The larger increase in NCEE's own research agenda, starting in FY10 and extending through FY11, reflected increases in resources used to support several major new Agency initiatives that called for new economic tools and information, including work to value the benefits of water quality improvements in the Chesapeake Bay; retrospective analyses of the costs of EPA regulations; and investigation of the potential impacts of regulation on employment levels and economic growth.

Reductions in EPA and OA's budget called for in the FY12 appropriations bill are still under examination as to their consequences for funding economic research in NCEE. The FY13 budget submitted by the President requests that funding levels be restored and increased beyond FY11 enacted levels, given the importance of economics and social science information to the decision making process.

What follows are some brief descriptions and highlights of current economic and social science research efforts supported by OP, NCEE.

### Current EDS Awards

NCEE funded [seven grants](#) (out of 22 eligible applications) to support environmental economics workshops from the 2008 base NCEE research program. Some of these were single event, topic-focused on subjects such as land use, meta-analysis, experimental methods, and micro-econometrics. Others were multi-year awards to support dissemination of research findings (Heartlands, Camp Resources, NBER Summer series)

NCEE funded [six grants](#) (out of 11 eligible applications) for dissertation/early career research in environmental economics from 2009 EDS competitive solicitation. This solicitation was specifically designed to support “gathering data for use in doctoral dissertations and other early career research in those areas of environmental economics involving pollution control.” NCEE considers these kinds of award to be a cost-effective way to encourage research. NCEE also issued [three awards](#) (out of 23 eligible applications) for research on market mechanisms. This part of the solicitation was to support “normative or positive research in the design of policies for pollution control using market mechanisms, particularly second-best and piecemeal approaches to regulation as well as multiple, hybrid, or adaptive policies to control one or more externalities or other problems.”

Last, NCEE funded [five grants](#) (out of 22 eligible applications) as part of its competitive solicitation issued in FY2010 to support additional workshop and dissertation/early career research projects. The solicitation invited proposals that support environmental economic workshops and dissertation/early career research projects. Four of the grants will support workshops, and the fifth supports an early career research project.

### NCEE Internal Research

#### 1. Guidance Materials

- ***Guidelines for Preparing Economic Analyses*** The [Guidelines](#) serve several important functions: (1) they assist policy makers in developing regulations that achieve the highest environmental quality and human health standards at the lowest costs; (2) provide analysts with information needed to prepare high quality economic analyses; (3) develop an overarching framework for economic analyses throughout the Agency and across EPA Program Offices; and (4) ensure that important subjects such as uncertainty, timing, and valuation of costs and benefits, are treated consistently in all economic analyses at EPA. EPA will use the *Guidelines* to evaluate the economic consequences of its regulations and policies to insure that they contribute to a safe environment and a healthy economy.

- ***Handbook on the Benefits, Costs, and Impacts of Land Cleanup and Reuse.*** EPA's [Handbook](#) summarizes the theoretical and empirical literature addressing benefit-cost and impact assessment of the cleanup and reuse scenario. When possible, recommendations are provided for conducting economic analysis of land cleanup and reuse sites and programs. The knowledge base for estimating the benefits, costs and impacts of land cleanup and reuse is still in its formative stages. Thus, another purpose of the *Handbook* is to provide a window into recent research and raise and clarify important questions that remain in the literature. The information provided in the *Handbook* should allow analysts to more fully characterize the net benefits and impacts of EPA policies and programs targeting land cleanup and reuse

## 2. Publications and Working Papers

NCEE economists and scientists engage directly in research to fill gaps in knowledge, often with support from other EPA offices. [NCEE staff](#) research continues to present research at professional conferences, and to [publish in peer reviewed journals](#), producing an average of 20-30 papers per year in economics and risk science fields. NCEE also supports its own [working paper](#) series, adding 7 entries in FY 2011, for a total of 92 papers in the series since its inception in 2001.

## 3. Workshops

NCEE continues to host workshops, drawing upon external expertise and advice on a number of key environmental economics issues, including showcasing EDS-funded research. These include:

- NCEE and OAR's climate change office co-sponsored a [Workshop on Intergenerational Discounting](#) held at Resources for the Future on September 22 and 23, 2011 to seek advice on how the benefits and costs of regulations should be discounted for projects with long horizons—that is, for projects that affect future generations. In contrast to the case of intragenerational discounting, where guidelines are well-established, both EPA and the Office of Management and Budget (OMB) give analysts more flexibility in discounting the net benefits of projects that affect future generations. The purpose of the workshop was to seek advice from the 12 panelists listed below as to how analysts might proceed in these cases. Work continues on a paper summarizing the findings of the workshop, for eventual publication in the journal [Review of Environmental Economics and Policy](#).
- NCEE participated an inter-agency 'social cost of carbon' workgroup that used the DICE, FUND, and PAGE integrated assessment models to estimate time paths of the social costs of carbon for use in future U.S. government regulatory analyses. This work was completed in early 2010, culminating in a [technical support document](#) cited in federal regulations concerned with GHG emissions. In preparation for future refinements, EPA and DOE co-hosted a pair of workshops to improve the scientific and economic understanding of the potential impact of

- climate change on human wellbeing. The first was held Nov 18-29, 2010 and second on Feb 27-28, 2011 with both centering on the topic [“Improving the Assessment and Valuation of Climate Change Impacts for Policy and Regulatory Analysis.”](#) Findings presented at the workshop are to be published in a special issue of the journal *Climatic Change* in 2012.
- EDS-funded research on the [Economic Benefits of Information Disclosure](#). (Alexandria, VA, January 18, 2011). The workshop included sessions on energy efficiency labels, the effectiveness of the Toxics Release Inventory, and the interactions of inspections and audits. The workshop also had a panel featuring different perspectives on information disclosure programs, emissions, and compliance.
  - NCEE also organized a workshop (June 9-10, 2010) on [Analytical Methods for Assessing Environmental Justice \(EJ\) Implications of Environmental Regulations](#). The workshop gathered a small group of economists, regulatory experts, and EJ community leaders to discuss methods for incorporating EJ analyses into EPA’s regulatory process. Sessions included overviews of EJ activities within an EPA program (e.g., Air, Water, Solid Waste, etc.), technical presentations on EJ methodologies, data needs, analytical requirements, and merits and limitations. The workshop also included a panel discussion with EJ community leaders in which they outlined the types of questions they would like to see addressed by the EJ analyses. This work serves as input to ongoing efforts to develop supplemental materials to EPA’s Economic Guidelines, and encourage testing and development of new tools used in EJ analyses.

#### 4. Applied Research – some examples

NCEE engages in a number of initiatives aimed at producing new and improved economic methods and data used to help support development and evaluation of Agency policies and the development of regulatory actions. Many of these initiatives are longer-term projects, extending over several fiscal years. Some main ones currently underway in FY12, and which are anticipated to extend into FY13 include the following:

- The **Retrospective Cost Study (RCS)** is an effort initiated by EPA to evaluate the degree to which ex-ante costs and ex-post costs differ and identifying possible reasons for the divergence. Available studies (of which there are few) have shown that ex-ante cost estimates in EPA BCAs often differ from the ex-post costs of regulations. Despite these findings, EPA has not systematically analyzed either the difference between the actual costs of complying with a regulation and the estimates of compliance costs predicted in the RIAs or the reasons for any difference. The goal is to determine if there are any systematic biases in EPA’s ex-ante cost estimates, and if so, determine the sources of these biases to improve ways of estimating compliance costs. This work is among the list of EPA actions included in the regulatory review plan required by President Obama’s Executive Order 13563 on [“Improving Regulation and Regulatory Review.”](#) The analytic methods and results of the first set of reviewed regulations will be reviewed by

the Science Advisory Board this coming April, and the first complete report will be later in 2012.

- **Exploring Barriers to Business Investment Decisions in Emission Reduction Technologies** – NCEE has invested in a pilot study to evaluate how businesses and consumers make investment decisions to gain insight into what factors could explain apparent underinvestment in emission reducing technologies absent government regulation. Although a number of studies exist that examine why individual consumers may under-invest in energy efficiency, none have systematically explored why such a phenomena occurs and, to our knowledge, no studies have examined whether similar undervaluation occurs on the part of businesses. Lack of empirical evidence on why businesses and consumers do not invest in energy saving technologies that appear cost-effective limits EPA’s ability to judge which hypothesis is more or less valid with regard to a given market. This project seeks to better understand investment decision-making by collecting and analyzing information, data, and identify any systematic determinants of business investment decisions that explain whether and why there may be private benefits attributable to regulation.
- **Employment Analyses of EPA Rules** - While estimates of employment impacts are not typically included in a standard benefit-cost analysis (except to the extent that labor costs are part of total costs in a benefit cost analysis) this topic has become of particular concern in the current economic climate of sustained levels of high unemployment. EPA is committed to using the best available science, relying on relevant theoretical and empirical literature in the field. After a careful search through the economics literature, we have uncovered a limited range of valid tools to support Agency assessments of these impacts. Perhaps surprisingly, limited existing theoretical and applied work exists on these questions, and what are available remains inadequate to support developing new tools. To address this gap, EPA has commissioned a series of white papers and plans to convene experts in labor and macroeconomics to examine this topic and to share information on their findings in 2012. The objective of this work will be to establish strong scientific foundation for economic analysis of the issue of regulations and effects on employment.
- **Benefits of Reducing CO<sub>2</sub> and Other Greenhouse Gases** - NCEE is funding and conducting research in several areas pertinent to improving valuation of reducing CO<sub>2</sub> and other GHGs. In preparation for anticipated future refinements of the U.S. government’s interagency social cost of carbon (SCC) estimates and ongoing work to improve regulatory assessment and policy analysis, NCEE held two workshops in late 2010 and early 2011 that brought the best climate modelers from the scientific and economic communities together to discuss gaps in the literature and modeling capabilities. Since then, NCEE has been exploring issues raised in the workshops and tackling other research gaps identified through the 2010 interagency SCC modeling exercise, including: improving or replacing the climate module in the three models used in the SCC interagency process; identifying policy-relevant climate catastrophes and recommending their

- improved representation in integrated assessment models; improving the characterization of uncertainty in baseline socio-economic and emission projections; seeking expert advice on different methodological approaches to intergenerational discounting; developing preliminary estimates of the social costs of non-CO2 GHGs; and developing models that integrate atmospheric, oceanographic, ecological and economic systems in order to include the coral reef and shellfish impacts of ocean acidification in future cost benefit analyses.
- **Cumulative costs and/or benefits of EPA Rules** – The SAB is well-acquainted with the oft-cited information and analytical tools used to produce the Clean Air Act [Retrospective](#) and [Prospective](#) studies (including the second Prospective study issued in August 2010) that have helped to demonstrate the substantial overall net benefits to society and the economy from air pollution control programs. EPA used the results of this study to help support decisions on future investments in air pollution research. In addition, lessons learned in conducting these analyses help better target efforts to improve the accuracy and usefulness of future economic analyses prepared by the Air program. Other EPA program offices could benefit from this type of analysis, but face greater challenges in assembling the necessary information on costs and benefits to produce reports as robust as those prepared by the Air program. EPA seeks to support efforts to generate data and craft analytic tools needed by EPA program offices to consider their cumulative impacts, focusing on utilizing computable general equilibrium analytic models and frameworks to capture expected net social effects.
  - **Water Quality and Ecological Benefits** - NCEE proposes to continue investments in benefit estimation methods and analyses, drawing guidance from recent efforts in the scientific community to assess current methods used to value ecological services (e.g., Science Advisory Board's, [Committee on Valuing the Protection of Ecological Systems and Services](#)). This work has been supporting several EPA regulations (e.g., CWA Section 316(b) cooling waters rule, effluent guidelines rules), and ongoing effort to evaluate the economic consequences of management actions proposed to address water quality conditions in the Chesapeake Bay watershed. Products from these efforts are designed to serve as pilot studies, generating tools and information transferrable to use in the economic analyses of the benefits of water quality improvements for other policies and regulations. In addition to updating methods used to evaluate market services (e.g., commercial fishing and harvesting; recreational fishing and other recreational use of natural habitats and products; and property values), new research is underway to better quantify other ecological services and “non use” values arising from esthetic or ethical perceptions that cannot be directly quantified in market-related transactions.
  - **Methodology Development for Systematic Reviews of Environmental Contaminants** - NCEE has identified development of systematic review methodologies as important research to support its work on both health benefits analysis and children's environmental health indicators. Systematic reviews can be used to identify endpoints with sufficient evidence and data to be included in a

benefits analysis; to generate quantitative estimates of effects (through meta-analysis) that can contribute to quantification of benefits; and can provide support to the selection of topics for environmental health indicators. However, systematic review methods from medicine are not fully transferable to environmental health science because of differences in the types of evidence generally available (e.g., randomized clinical trials in medicine vs. toxicological studies and observational epidemiology in environmental health). This project involves adaptation of systematic review methodologies for use in evaluating evidence of health effects from exposure to environmental contaminants, and applying methods to illustrative case studies. The first case study is evaluating maternal exposure to perfluorooctanoic acid (PFOA) and possible effects on fetal growth, as indicated by outcomes such as low birth weight, considering both toxicological and epidemiological studies. If data are determined to be sufficient, this case study will include meta-analysis that may be useful for quantifying effects of human PFOA exposure on birth weight.