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XXXX XX, 2012

EPA-SAB-12-xxx

The Honorable Lisa P. Jackson  
Administrator  
U.S. Environmental Protection Agency  
1200 Pennsylvania Avenue, N.W.  
Washington, D.C. 20460

Subject: Science Advisory Board Comments on the President's Requested FY  
2013 Research Budget

Dear Administrator Jackson:

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INSERT TEXT

Sincerely,

Dr. Deborah L. Swackhamer  
Chair  
Science Advisory Board

Dr. Taylor Eighmy  
Chair  
SAB Research Budget Work Group

## NOTICE

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3 This report has been written as part of the activities of the EPA Science Advisory Board (SAB),  
4 a public advisory group providing extramural scientific information and advice to the  
5 Administrator and other officials of the Environmental Protection Agency. The SAB is  
6 structured to provide balanced, expert assessment of scientific matters related to problems facing  
7 the Agency. This report has not been reviewed for approval by the Agency, and, hence, the  
8 contents of this report do not necessarily represent the views and policies of the Environmental  
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10 Mention of trade names of commercial products does not constitute a recommendation for use.  
11 Reports of the SAB are posted on the EPA website at <http://www.epa.gov/sab>.

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## TABLE OF ACRONYMS AND ABBREVIATIONS

ACE	Air, Climate and Energy
CSS	Chemical Safety for Sustainability
HHRA	Human Health Risk Assessment
HSR	Homeland Security
IRIS	Integrated Risk Information System
NCEE	National Center for Environmental Economics
ORD	Office of Research and Development
SHC	Sustainable and Healthy Communities
SSWR	Safe and Sustainable Water Resources

# Science Advisory Board Comments on the President's Requested FY 2013 Research Budget.

## 1. Background

Historically, the Science Advisory Board (SAB) has reviewed the President's annual research budget request for the EPA. The annual reviews have focused on research programs in the Office of Research and Development (ORD) and on the Economics and Decision Science program within the Office of Policy. Since 2007, in parallel with the budget reviews, the SAB also has advised ORD on strategic research directions. The Board provided advice on this topic most recently in a report developed jointly with ORD's Board of Scientific Counselors (U.S. EPA SAB 2011a). The review of the President's FY 2013 request is informed by, but is separate from, ongoing efforts to provide strategic advice to ORD. It focuses on the adequacy of the President's FY 2013 budget for advancing the EPA's strategic research directions and achieving the priority science outputs identified in the President's Budget. These ORD priority science outputs support EPA's decision making.

For this report, the SAB reviewed the *FY 2013 EPA Budget in Brief* and the President's FY 2013 budget request for each of ORD's six research areas (Air, Climate and Energy; Safe and Sustainable Water Resources; Sustainable and Healthy Communities; Chemical Safety for Sustainability; Human Health Risk Assessment; and Homeland Security). The SAB also reviewed the President's FY 2013 request for a seventh research area, Economics and Decision Science, directed by the National Center for Environmental Economics (NCEE) in the EPA's Office of Policy.

ORD supplemented the President's budget request with strategic research action plans released in February 2012 to provide an overview for all of ORD's research programs (U.S. EPA 2012f) and more detailed information for each of the six programs (U.S. EPA 2012a, 2012b, 2012c, 2012d, 2012e, and 2012g). ORD's program-specific research action plans provide a problem statement for each of the research areas and identify the research vision. The plans describe the statutory and policy context, major partnerships, research themes, and priority science questions within each theme. Most important for this budget review, the strategic research plans provide tables identifying expected ORD outputs by upcoming fiscal years. The SAB also reviewed the President's FY 2013 request for the Economics and Decision Science research program and a short Program Overview for that research program. The SAB received briefings from representatives of the EPA's Office of the Chief Financial Officer, ORD and NCEE and received supplementary information on budget trends from ORD. All these review materials are available on the SAB website.<sup>1</sup>

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<sup>1</sup>Review and background materials for this review are available at:  
<http://yosemite.epa.gov/sab/sabproduct.nsf/a84bfee16cc358ad85256ccd006b0b4b/ad9f4d64737919c285257966004b53e11?OpenDocument&Date=2012-03-01> (accessed 03/03/12)

1  
 2 Table 1 provides an overview of the President’s requested FY 2013 ORD budget by  
 3 Program/Project. Section 3.7 of this report provides the President’s requested FY 2013 budget  
 4 for the Economics and Decision Science research program.  
 5

6 **Table 1: Overview of the ORD Budget by Program/Project**

7 Totals may not add exactly due to rounding

Program/Project	FY 2011 Enacted		FY 2012 Enacted		FY 2013 Pres Bud		Change from 2012 to 2013	
	\$M	FTE	\$M	FTE	\$M	FTE	\$M	FTE
Air, Climate & Energy Research	\$106.3	311.2	\$98.8	306.6	\$105.9	308.4	\$7.0	1.8
Safe & Sustainable Water Resources Research	\$117.3	435.7	\$113.5	436.3	\$121.2	443.5	\$7.7	7.2
Sustainable & Healthy Communities Research	\$195.1	633.4	\$188.9	612.7	\$184.1	620.9	-\$4.8	8.2
Chemical Safety for Sustainability Research	\$89.2	284.1	\$91.7	291.2	\$94.2	293.5	\$2.5	2.3
Human Health Risk Assessment	\$47.1	196.6	\$42.9	193.4	\$43.8	195.9	\$0.9	2.5
Homeland Security Research	\$26.7	64.3	\$26.6	64.1	\$26.4	64.7	-\$0.2	0.6
National Priorities	\$0.0	0.0	\$5.0	0.0	\$0.0	0.0	-\$5.0	0.0
<b>Total</b>	<b>\$581.7</b>	<b>1925.3</b>	<b>\$567.5</b>	<b>1904.3</b>	<b>\$575.6</b>	<b>1926.9</b>	<b>\$8.1</b>	<b>22.6</b>

8  
 9 For this review, the SAB addressed four questions for each program area:

- 11 • How well will the requested budget permit the EPA to advance its strategic research  
 12 directions as reflected in the Strategic Research Action Plan for the ORD program area  
 13 (or the NCEE Economics and Decision Science research program overview) and the  
 14 priorities identified in the President’s Budget? Are there any areas where the EPA should  
 15 increase investments or reduce investments, based on demonstrated accomplishments or  
 16 clearly identified needs?
- 17 • Are the changes since the FY 2012 enacted budget appropriate, taking into consideration  
 18 overall resources, FTEs, and intramural and extramural resources?
- 19 • Are there well-defined objectives/work products for next year’s budget? Can these  
 20 objectives/work products be achieved with the given resources?
- 21 • Are there opportunities to leverage the EPA resources with other resources, particularly  
 22 federal resources?  
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1 **2. Overarching findings and observations**

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3 The President’s Fiscal Year (FY) 2013 budget request calls for a 1.2 percent reduction from the  
4 FY 2012 enacted budget for the EPA as a whole, a 1.7 percent increase in Science and  
5 Technology programs within the agency and a 1.4 percent increase for ORD. ORD’s percentage  
6 of the EPA budget authority (6.9 percent) is slightly increased relative to recent years and there  
7 is a requested small increase in ORD full-time equivalent (FTE) employees (an increase of 1.1  
8 percent from the FY 2012 enacted budget to 1926.9 FTEs in the FY 2013 President’s budget  
9 request). Although the small increases requested for ORD recognize the importance of research  
10 to the EPA’s mission, funding for ORD in real dollars has declined 28.5 percent (in GDP  
11 indexed dollars) from the high in 2004 to the President’s FY 2013 budget request for ORD in  
12 2013 (a total of \$575.6 or \$422.3 in GDP-indexed dollars). The President’s budget request, in  
13 light of inflation, supports ORD in a time of budget deficits but limits the research that can be  
14 conducted to support the EPA’s efforts to protect human health and the environment.

15  
16 In general, the SAB finds that the President’s FY 2013 budget request will allow ORD to meet  
17 many but not all of the priorities identified in the strategic research action plans and the outputs  
18 noted in the President’s Budget request. Most notably, IDENTIFY HIGHLIGHTS

19  
20 All of ORD’s research programs identify a sustainability focus, but this sustainability focus  
21 requires consideration of the human dimension. The President’s research budget request for FY  
22 2013 does not identify resources for the needed integration of the social, behavioral, and decision  
23 sciences in the EPA’s research programs. Research on human behavior, institutions, markets and  
24 trading mechanisms, examination of ex ante and ex post costs are critical to the success of  
25 ORD’s research programs as they relate to the EPA’s regulatory and strategic goals. Closer  
26 collaboration with the EPA’s NCEE and mutual leveraging of resources can provide ORD with  
27 access to expertise in economics and can help strengthen the NCEE program as well.

28  
29 The SAB welcomes the President’s continued support for the Science to Achieve Results  
30 (STAR) grants and STAR fellowship programs. There is an 8 percent increase in STAR grants  
31 from the FY 2012 enacted budget to \$67.0M in the FY 2013 President’s budget request and  
32 STAR Fellowships are held constant at \$14.0M. These programs, which foster ORD interactions  
33 with the wider scientific community, are important for stimulating innovation and cross-program  
34 integration. The SAB considers it a priority to increase STAR fellowships, if possible, to  
35 advance ORD’s strategic research goals.

36  
37 In 2011, ORD’s restructured its thirteen research programs into six consolidated research  
38 programs with a commitment to a transdisciplinary, systems- and sustainability-oriented  
39 approach to research. As a result of ORD’s restructuring, the Sustainable and Healthy  
40 Communities program is the largest program. The President’s budget request for FY 2013  
41 allocates roughly 30% of ORD’s total funds to this program; the five remaining research  
42 programs together shared the balance. [Should the report comment on the allocation across ORD  
43 programs?] With so many programs subsumed in the Sustainable and Health community,  
44 extraordinary care should be exercised in communicating its expected outputs and effecting  
45 integration with other ORD research programs.

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Although ORD has committed to implementing systems approaches, the President’s Budget as presently constructed “make the silos reappear,” since programs are singled out and cross-program activities are not described clearly. Cross-program integration processes are not transparent and appear amorphous to the SAB. These integration processes should be formalized, given more structure, and supported by dedicated resources. The SAB recommends that ORD seek new ways of budgeting for collaboration and integration to avoid research silos.

Although collaboration and integration require resources, they will also create synergies, eliminate duplication, and save resources in the long term. Active collaboration and integration are warranted not only among ORD programs, but across federal agencies as well. Some of the EPA’s cross-cutting themes (e.g., sustainability, environmental justice, building tribal partnerships, climate change) are multi-agency themes. Small amounts of funding from several agencies could be pooled to provide useful amounts of money, particularly in the areas of planning for food, fuel and energy security in climate-resilient communities. This strategy could leverage some current EPA grants, such as Tribal GAP funds that are so small that they often have marginal results.

ORD’s six strategic research action plans reference and build upon advice from the SAB and ORD’s Board of Scientific Counselors (SAB 2010 and 2011a), The SAB commends ORD for developing these strategic research action plans, a critical first step in implementing the integrated, transdisciplinary programs. [Should this SAB report commend some plans for their special clarity or features (e.g., evaluation or the specificity of outputs?)] The SAB recommends that ORD update the tables of expected research outputs in each strategic research action plan annually. Future budget development and review could be made more efficient and transparent because a direct comparison between planned and actual outputs could thus be made and progress toward multi-year objectives could be better understood.

1 **3. Specific Comments on the EPA’s Research Programs**

2 **3.1. Air, Climate and Energy**

3 ORD’s strategic research action plan for Air, Climate and Energy (U.S. EPA 2012a) identifies  
 4 the following problem statement, vision, and policy relevant research themes. Table 2 provides  
 5 an overview of the requested budget for the program.  
 6

<b>Air, Climate and Energy: problem statement, vision and themes</b>
<p><u>Problem statement:</u> <i>Protecting health and the environment from the impacts of climate change and air quality in a sustainable manner are central 21st century challenges. These challenges are complicated by the interplay between air quality, the changing climate, and emerging energy options.</i></p>
<p><u>Vision:</u> <i>EPA provides the cutting-edge scientific information and tools to support EPA’s strategic goals of protecting and improving air quality and taking action on climate change in a sustainable manner.</i></p>
<p><u>Policy-relevant research themes:</u></p> <ul style="list-style-type: none"> <li>• <i>Assess impacts – Assess human and ecosystem exposures and effects associated with air pollutants and climate change at individual, community, regional, and global scales;</i></li> <li>• <i>Prevent and reduce emissions – Provide data and tools to develop and evaluate approaches to prevent and reduce emissions of pollutants to the atmosphere, particularly environmentally sustainable, cost-effective, and innovative multipollutant and sector-based approaches; and</i></li> <li>• <i>Respond to changes in climate and air quality – provide human exposure and environmental modeling, monitoring, metrics and information needed by individuals, communities, and governmental agencies to adapt to the impacts of climate change and make public health decisions regarding air quality.</i></li> </ul>

7  
8  
9 **Table 2: Budget overview for the Air, Climate and Energy Program**

10 Dollar totals may not add exactly due to rounding.

Program/Project	FY 2011 Actuals		FY 2012 Enacted		FY 2013 Pres Bud		Change from 2012 to 2013	
	\$M	FTE	\$M	FTE	\$M	FTE	\$M	FTE
Global Change	\$19.4		\$18.3		\$20.3		\$2.0	
Clean Air	\$19.1		\$78.5		\$82.9		\$4.3	
Other	\$9.2		\$2.0		\$2.8		\$0.7	
<b>Air, Climate &amp; Energy Research Totals</b>	<b>\$106.3</b>	<b>311.2</b>	<b>\$98.8</b>	<b>306.6</b>	<b>\$105.9</b>	<b>308.4</b>	<b>\$7.0</b>	<b>1.8</b>

1 How well will the requested budget permit the EPA to advance its strategic research directions as  
2 reflected in Air, Climate and Energy strategic research action plan and the priorities identified in  
3 the President’s Budget? Are there any areas where the EPA should increase investments or  
4 reduce investments, based on demonstrated accomplishments or clearly identified needs?

5  
6 The requested budget will permit the EPA to advance many of the strategic research directions  
7 reflected in the strategic research action plan (U.S. EPA 2012a). For the clean air subprogram,  
8 these include a focus on multi-pollutant approaches, hydraulic fracturing impacts and a shift to  
9 new, more efficient ways to monitor air quality. For the global change subprogram, this includes  
10 work at the local, regional and national level on climate change impacts and adaptation. For the  
11 energy subprogram, work on impacts of biofuels is included.

12  
13 The clean air program is one of the EPA’s biggest success stories with estimated benefits far  
14 outweighing the costs. The ORD investment in the underlying science supporting the National  
15 Ambient Air Quality Standards has had enormous returns (Heintz et al. 2011, U.S. EPA 2011)  
16 and must be continued. The requested budget supports this priority.

17  
18 For climate change research, the President’s budget focuses on adaptation products and does not  
19 highlight plans for climate change mitigation and global-level work described in the strategic  
20 research action plan and listed as FY 2013 outputs. The EPA has clarified that mitigation-related  
21 research is being added to adaptation-related research already being conducted, because EPA’s  
22 expanded role in mitigation, resulting from the Endangerment Finding. The SAB views this dual  
23 focus positively.

24  
25 Life-cycle assessment across energy technologies, which is mentioned in the strategic research  
26 action plan, does not appear to be a priority in FY 2013 based on the budget narrative. The Air,  
27 Climate and Energy program should have a major role in this line of research, in collaboration  
28 with other ORD programs.

29  
30 Economic and social sciences work warrant greater emphasis in the Air, Climate and Energy  
31 program. Understanding how to affect behavioral change is central to the Administrator’s goals  
32 of taking action on climate change and improving air quality. Effective approaches to decreasing  
33 vehicle miles traveled, for example, will advance both goals.

34  
35 Are the changes since the FY 2012 enacted budget appropriate, taking into consideration overall  
36 resources, FTEs, and intramural and extramural resources?

37  
38 Given resource constraints, the Air, Climate and Energy program is attempting to accomplish  
39 important work efficiently, leveraging other resources and partnerships. There is a 7.2 percent  
40 increase in total resources from the FY 2012 enacted budget to \$105.9M in the FY 2013  
41 President’s budget request, relative to 1.4 percent overall increase in entire ORD budget. There is  
42 an increase in person-years of 0.5 percent to 308.4 person-years in the FY 2013 President’s  
43 budget request, relative to the FY 2012 enacted budget.

44  
45 The requested modest increase in Clean Air funds (6.0 percent increase from the FY 2012  
46 enacted budget to \$82.9M in the FY 2013 President’s budget request) is needed. It is required to

1 provide the scientific and methodological basis for moving to multi-pollutant approach and the  
2 research supporting a shift toward cheaper alternative approaches to monitoring air quality, two  
3 important activities. The requested investment of \$3.76M in research on hydraulic fracturing  
4 impacts on air quality is appropriate. This research is needed so that the EPA can provide science  
5 to support decisions made by policy makers and practitioners. Since the use of this technology is  
6 proceeding rapidly, the EPA should ensure that sufficient funds are devoted to lay the foundation  
7 of the science needed to evaluate its effects.

8  
9 While the percent increase for Global Change is relatively large (10.9%), the absolute amount of  
10 the budget (\$20.3M, or ~5% of entire ORD budget) is low relative to the magnitude of the  
11 problem and the EPA's role under the endangerment finding and relative to all the other ORD  
12 programs.

13  
14 EPA has provided a sufficient rationale for eliminating several programs (e.g., the Mercury  
15 Research Program, fluid modeling facility) and significantly reducing others (e.g., development  
16 of exposure assessment tools).

17  
18 Are there well-defined objectives/work products for next year's budget? Can these  
19 objectives/work products be achieved with the given resources?

20  
21 The President's budget identifies a number of important objectives and work products for FY  
22 2013. There is every reason to think that these are achievable with the proposed budget given the  
23 limited information provided to the SAB. The objectives are well-defined but, in some instances,  
24 hydraulic fracturing research) they could be more specific (for example, in the development of  
25 information and tools to help communities address impacts of climate change on air and water  
26 quality) or more consistent with the strategic research action plan (e.g., hydraulic fracturing,  
27 which is not identified in the strategic research action plan).

28  
29 Are there opportunities to leverage the EPA resources with other resources, particularly federal  
30 resources?

31  
32 The SAB supports ORD use of systematic, clearly identified mechanisms to foster collaboration  
33 across ORD programs. Such mechanisms are critical to encourage system-wide approaches. The  
34 majority of Air, Climate and Energy activities lend themselves to systems approaches and to  
35 collaboration across ORD programs (e.g., the multi-pollutant approach requires collaboration  
36 with the Human Health Risk Assessment, Safe and Sustainable Water Resources and Sustainable  
37 and Healthy Communities and life-cycle analysis of different energy options requires  
38 collaboration with all ORD programs.)

39  
40 EPA is aware of the many existing opportunities to leverage other federal resources in the areas  
41 of air pollution, climate change and energy, and is actively engaged in efforts to coordinate and  
42 maximize impact, including collaboration with the National Institute of Environmental Health  
43 Sciences, National Center for Environmental Health, Department of Energy, Federal Highway  
44 Administration, National Aeronautics and Atmospheric Administration, and the U.S. Global  
45 Change Research Program.

1 Because cook stove emissions may differ during use in different geographical and cultural  
 2 contexts and adoption is critical for adding a new intervention like this technology, the EPA  
 3 should consider pursuing the suggestion by SAB last year that the Air, Climate and Energy  
 4 program engage science and engineering graduate students in Peace Corps Master’s International  
 5 programs in its cook stove work. The SAB advises to program to build on an existing 2010  
 6 Memorandum of Understanding between the EPA and Peace Corps.

7 **3.2. Safe and Sustainable Water Resources**

8 ORD’s strategic research action plan for Safe and Sustainable Water Resources (U.S. EPA  
 9 2012e) identifies the following problem statement, vision, and policy relevant research themes.  
 10 Table 3 provides an overview of the requested budget for the program.  
 11

<b>Safe and Sustainable Water Resources: problem statement, vision and themes</b>	
<u>Problem statement:</u> <i>Increasing demands for sources of clean water combined with changing land use practices, growth, aging infrastructure, and climate change and variability, pose significant threats to the Nation's water resources. Failure to manage our Nation's waters in an integrated, sustainable manner will limit economic prosperity and jeopardize both human and aquatic ecosystem health.</i>	
<u>Vision:</u> <i>SSWR uses an integrated, systems approach to research for the identification and development of the scientific, technological and behavioral innovations needed to ensure clean, adequate and equitable supplies of water that support human well-being and resilient aquatic ecosystems.</i>	
<u>Policy-relevant research themes:</u>	
<ul style="list-style-type: none"> <li>• <i>Sustainable water resources - Ensure safe and sustainable water quality and availability to protect human and ecosystem health by integrating social, economic and environmental research for use in protecting and restoring water resources and their designated uses (e.g., drinking water, aquatic life, recreation, industrial processes) on a watershed scale.</i></li> <li>• <i>Sustainable water infrastructure systems – ensure that water of sufficient quality is available to meet human uses and needs and maintain resilient aquatic ecosystems.</i></li> </ul>	

12  
13  
14 **Table 3: Budget overview for the Safe and Sustainable Water Resources Program**

15 Dollar totals may not add exactly due to rounding.

Program/Project	FY 2011 Actuals		FY 2012 Enacted		FY 2013 Pres Bud		Change from 2012 to 2013	
	\$M	FTE	\$M	FTE	\$M	FTE	\$M	FTE
Drinking Water	\$50.9		\$50.2		\$51.6		\$1.5	
Water Quality	\$66.6		\$63.3		\$69.5		\$6.3	
Safe & Sustainable Water Resources								
Research Totals	\$117.3	435.7	\$113.5	436.3	\$121.2	443.5	\$7.7	7.2

16  
17 How well will the requested budget permit the EPA to advance its strategic research directions as  
 18 reflected in Safe and Sustainable Water Resources Strategic Research Action Plan and the  
 19 priorities identified in the President’s Budget? Are there any areas where the EPA should

1 increase investments or reduce investments, based on demonstrated accomplishments or clearly  
2 identified needs?

3 In the strategic research action plan for the Safe and Sustainable Water Resources (U.S. EPA  
4 2013e), ORD identifies seven issue areas<sup>2</sup> that impact water resources and build the foundation  
5 for the research approach. The program encompasses two broad, interrelated research themes:  
6 Sustainable Water Resources and Sustainable Water Infrastructure Systems. Each theme is then  
7 mapped to priority science questions. The SAB is impressed with the breadth of interactions in  
8 developing these research priorities. Input was considered from EPA scientists, EPA regions, the  
9 EPA's Office of Water, other federal programs, as well as other stakeholders across water  
10 associations, utilities, water research foundations, environmental groups, tribes, industry and  
11 state agencies.

12 The requested allocation of funds within the Safe and Sustainable Water program is appropriate.  
13 The increase of \$4.3M to investigate the impacts of hydraulic fracturing within the Safe and  
14 Sustainable Water Resources programs complements the research investment related to hydraulic  
15 fracturing in the Air, Climate and Energy program. This prioritization is consistent with  
16 comments from the SAB and fosters collaboration and crosscutting research among ORD  
17 programs. The requested increase of \$2.0M for a Southern New England Program for Innovative  
18 Estuarine Approaches (identified in the *FY 2013 EPA Budget in Brief* as the Center for  
19 Innovative Estuarine Approaches) and the requested increase of \$1.8M for regional projects and  
20 research to monitor and understand the benefits of existing integrated natural, green and grey  
21 infrastructure are important. Although these increases are modest, it is appreciated in an  
22 environment of scarce economic resources, as the requested investment demonstrates that the  
23 Administration understands the importance of research generally and the Safe and Sustainable  
24 Water program specifically.

25 The decision to reduce funding for the Beaches Program is appropriate, as this program has  
26 delivered the information and data for which it was designed. However, the SAB recommends  
27 continued funding for programs that are associated with the control of pathogens in drinking  
28 water.

29 The prioritization and allocation of resources in the requested budget are strategic and map well  
30 to the problem statement and expected research outcomes listed in the strategic research action  
31 plan. The Safe and Sustainable Water Resources program must prioritize research that addresses  
32 stressors such as increasing demand for clean water sources, changing land use practices and  
33 aging infrastructure place on water quality. Although strong consideration of crosscutting areas  
34 such as hydraulic fracturing is important, ORD should also support research on monitoring and  
35 emerging contaminants such as endocrine disruptors and pharmaceutical compounds.

36 Water reuse is a priority research area that is mentioned both in the strategic research action plan  
37 and in the President's Budget for ORD. However, it is not clear from the budget information  
38 provided to the SAB where there is funding to support research for this priority area. The EPA  
39 recently co-sponsored a study by the National Academy of Sciences (NAS) on water reuse (NAS

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<sup>2</sup> increasing demand for sources of clean water; changing land use practices; growth; aging infrastructure; increasing energy and food demands; increasing chemicals in commerce, and climate variability and change

1 2012). This report outlines 14 research priorities for water reuse for the EPA to consider in  
2 budget planning. Although other groups are active in the area of water reuse (e.g., WaterReuse's  
3 Association and Foundation), there is a need for scientific leadership from federal agencies, like  
4 the EPA and perhaps the Centers for Disease Control, especially in the area of research on the  
5 potential health impacts associated with reuse not only reuse of municipal wastewater but also  
6 reuse of greywater. The SAB advises the EPA to lead research in the important area of water  
7 reuse, which is currently being led primarily by practitioners. The EPA is in a unique position to  
8 partner with federal agencies such as Centers for Disease Control to address critical research  
9 needs related to health risk that may be associated with using reclaimed water.

10 SAB strongly supports the use of a systems-based approach to nutrient management as described  
11 in the President's budget. Such a systems approach should include investments in research on  
12 human systems as well as natural systems. It is not clear from materials provided to the SAB  
13 whether the requested budget intended for nutrient research includes social, behavioral and  
14 decision science research focus on understanding behavior of people and larger human systems,  
15 and designing and implementing new institutional approaches, such as nutrient trades and  
16 nutrient markets. Such research is especially significant given the importance of non-point  
17 pollution and the need to develop effective, innovative mechanisms and institutions for  
18 prevention and control.

19 Overall, the requested level of funding for the Safe and Sustainable Water Resource program  
20 will enable the program to reach its prioritized research goals.

21 Are the changes since the FY 2012 enacted budget appropriate, taking into consideration overall  
22 resources, FTEs, and intramural and extramural resources?

23  
24 There is a 6.8 percent increase in total resources from the FY 2012 enacted budget to \$121.2M in  
25 the FY 2013 President's budget request. The President's Budget also requests an increase of 6.2  
26 FTE over the FY2012 enacted for a total of 443.5 in the FY 2013 President's budget request.

27 The overall increase is appropriate, especially given the difficult current economic environment.  
28 The Safe and Sustainable Water Resources program represents a merger of mature and effective  
29 water research programs with a strong history of conducting good science, and delivering  
30 important information in a timely manner. Specific allocation of resources to support hydraulic  
31 fracturing, ecosystem research and green infrastructure is appropriate.

32 Are there well-defined objectives/work products for next year's budget? Can these  
33 objectives/work products be achieved with the given resources?

34 The strategic research action plan for the Safe and Sustainable Water Resources program is  
35 noteworthy for the clarity of outcomes related to science questions presented in the Table of  
36 Outputs and Outcomes. This table is designed around the two overarching themes and seven  
37 science questions related to these themes. It presents a comprehensive roadmap of about 50 of  
38 the outputs and expected outcomes, i.e., the expected results or consequences that a partner or  
39 stakeholder will be able to accomplish due to ORD research. This table covers the period 2012  
40 through 2017. There is every reason to think that these are achievable with the proposed budget.

1 Are there opportunities to leverage the EPA resources with other resources, particularly federal  
2 resources?

3 The EPA has made a quantum shift in its operational culture/philosophy, first by consolidating  
4 programs and second by making a strong commitment to engage in collaborative and partnering  
5 research, both among its programs, and with other federal agencies. The strategic research action  
6 plan for the Safe and Sustainable Water Resources program documents the program’s strong  
7 efforts to actively engage other federal agencies in these collaborative and partnering ventures.  
8 The SAB would appreciate some indication of management and budget implications of  
9 collaborations, both within the EPA and with other federal agencies. The President’s Budget, for  
10 example, includes a discussion in the context of the Safe and Sustainable Water Program of  
11 establishing “Communities of Practice” across ORD on the topics of model protocols, hydrology  
12 and decision support. The idea is, a good one, but the budget does not identify which ORD  
13 program will lead the activities, and how the activity will be managed or supported by resources.

14 Related to the issue of water reuse, ORD’s Net Zero work highlights several issues related to  
15 sustainability: water reuse and energy consumption. This program involves collaboration with  
16 the Department of Defense to pilot technologies useful to communities. ORD should continue to  
17 build such partnerships and should reach out to agencies such as the Bureau of Land  
18 Management and other utilities that have existing activities and expertise in this area.

### 19 **3.3. Sustainable and Healthy Communities**

20 ORD’s strategic research action plan for Sustainable and Healthy Communities (U.S. EPA  
21 2012g) identifies the following problem statement, vision, and policy relevant research themes.  
22 Table 4 provides an overview of the requested budget for the program.  
23

**Sustainable and Healthy Communities: problem statement, vision and themes**

Problem statement: *Communities make social, economic, and environmental trade-offs in a resource-constrained world. These trade-offs are often not well characterized in terms of the implications and interactions between human health, ecosystem services, economic vitality, and social equity. Conventional decision-making often does not adequately characterize these complex interactions.*

Vision: *The Sustainable and Healthy Communities Research Program (SHC) will inform and empower decision-makers in communities, as well as in federal, state and tribal community-driven programs, to effectively and equitably weigh and integrate human health, socio-economic, environmental, and ecological factors into their decisions in a way that fosters community sustainability.*

Policy-relevant research themes:

- *Data and Tools to Support Community Decisions: data, methods, and indicators, spatial analyses, and decision tools to assist communities in developing effective approaches to achieve their sustainability goals.*
- *Forecasting and Assessing Ecological and Community Health: information and methods to help communities assess how the natural and built environments affect the health and well-being of residents and to identify sound and sustainable management options.*
- *Implementing Near-Term Approaches to Sustainable Solutions: methods and guidance to address existing sources of land and groundwater contamination that advance innovative approaches to reduce new sources of contamination and enable the recovery of energy, materials, and nutrients from existing waste streams. This research provides scientific support to EPA program and regional offices, states and tribes.*
- *Integrated Solutions for Sustainable Outcomes: will assess the state of the art for sustainable practices for four high-priority community decision areas with environmental impacts: waste and materials management; infrastructure, including energy and water; transportation options; and planning and zoning for buildings and land use. It will use whole-system modeling to integrate these four areas to better achieve outcomes with multiple benefits and to develop and test methods to estimate the Total Resource Impacts and Outcomes of alternate decisions (TRIO methods).*

Table 4: Budget overview for the Sustainable and Healthy Communities Program

Dollar totals may not add exactly due to rounding.

Program/Project	FY 2011 Actuals		FY 2012 Enacted		FY 2013 Pres Bud		Change from 2012 to 2013	
	\$M	FTE	\$M	FTE	\$M	FTE	\$M	FTE
Human Health	\$52.9		\$45.3		\$44.5		(\$0.8)	
Ecosystems	\$68.7		\$60.8		\$60.2		(\$0.6)	
Other research budgeted in the Science and Technology account	\$70.8		\$64.6		\$61.0		(\$3.6)	
Research budgeted in non Science & Technology accounts	\$23.1		\$18.2		\$18.4		\$0.2	
Sustainable & Healthy Communities Research (Totals)	\$215.51	633.4	\$188.9	612.7	\$184.1	620.9	(\$4.8)	8.2

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How well will the requested budget permit the EPA to advance its strategic research directions as reflected in SHC Strategic Research Action Plan and the priorities identified in the President’s Budget? Are there any areas where the EPA should increase investments or reduce investments, based on demonstrated accomplishments or clearly identified needs?

The President’s requested FY 2013 budget a modest reduction of 2.5 percent from the FY2012 enacted budget to \$184.1M. The President’s Budget also requests an increase of 8.2 FTE over the FY2012 enacted for a total of 620.9 in the FY 2013 President’s budget request.

While there is a relatively small (1 percent) reduction for ecosystems research from the FY 2012 enacted budget to \$60.2M in the President’s FY 2013 SHC budget request, this reduction follows a dramatic long-term downward trend since 2004 when the EPA ORD ecosystems budget was almost double (\$107M) the President’s request for FY 2013. As the SAB has noted in previous years (e.g., U.S. EPA 2011), the EPA should be cognizant of the potential impact of these reductions in research funding on the future direction of the SHC program.

Within the constraints of the FY 2013 budget, the Sustainable and Healthy Communities Program will be able to achieve the goals of the strategic plan only if it is able effectively to integrate work with the other ORD programs in the many areas where their goals and tasks are interdependent. Tracking nutrient flows (e.g., through the nitrogen cascade) is just one example of a complex goal that will require efforts from many other programs and agencies. In many cases, the Sustainable and Healthy Community program will take the lead in cross-program collaborations, and this cannot be accomplished without some cost. A concern is that integration and collaboration across programs is not explicitly identified among the tasks in the strategic plan and the cost of these activities does not seem to be specifically called out in the budget. True cross-program integration of scientific activities along with sharing of data can only take place when goals such as water and air quality for communities and ecosystems are planned in concert with other appropriate ORD programs, laboratories and research facilities, as well as relevant EPA offices and other federal and state agencies. Effective and efficient integration can leverage limited and declining budgets to accomplish the important and challenging tasks set out for the Sustainable and Healthy Communities program. But making that happen is not free.

Are the changes since the FY 2012 enacted budget appropriate, taking into consideration overall resources, FTEs, and intramural and extramural resources?

The *FY 2013 Budget in Brief* indicates that the President’s specific requests for research within the Sustainable and Healthy Communities program on human health (\$44.5M) and on ecosystems (\$60.2M) both show modest reductions from FY 2012 (about -1.8% and -1.0%, respectively). As noted above, the downward trend for ecosystems research has been persisted for many years and the overall effect continues to be of concern to the SAB.

1 Are there well-defined objectives/work products for next year's budget? Can these  
2 objectives/work products be achieved with the given resources?

3  
4 The presentation of research themes in the strategic research action plan for the Sustainable and  
5 Healthy Communities program shows detailed plans and outputs for FY 2013. While detailed  
6 levels of resources are not provided at this level of analysis, rough indications for levels of  
7 effort/resources were provided, ranking Theme 2 as the highest, followed by Themes 3 and 1,  
8 with Theme 4 generally receiving the lowest proportion of FY 2013 resources. Theme 2  
9 (forecasting and assessing ecological and community health) is clearly at the core of the program  
10 and central to the EPA mission of protecting human health and the environment. The activities  
11 planned under Theme 2 will be challenging and likely to be in high demand across the Agency  
12 now and well into the future. Theme 3 has the largest number of specified outputs for FY 2013,  
13 many of which can be seen to be in direct response to program office and other Agency needs for  
14 science to support current and near-term regulatory activities. Themes 1 and 4 both involve  
15 newer research directions where research methods and data are being developed as a foundation  
16 for future research. In sum, the general allocation of resources across research themes within the  
17 program for FY 2013 seems to be appropriate and well justified.

18  
19 The strategic research plan identifies numerous tasks and goals to address the Agency's  
20 environmental justice concerns (Theme 2, Topic 2.2), but all of these indicate multi-year time  
21 horizons (e.g., from FY 2011-FY 2016) making it difficult to determine what activities are to be  
22 funded by the FY 2013 budget. Similarly, it will be important for the Sustainable and Healthy  
23 Communities program to determine and report annual milestones for these activities so that  
24 progress can be effectively tracked and evaluated.

25  
26 Are there opportunities to leverage the EPA resources with other resources, particularly federal  
27 resources?

28  
29 The strategic research action plan for this program identifies a number of important  
30 collaborations and partnership agreements with Federal agencies outside of the EPA, including  
31 U.S. Geological Survey, U.S. Department of Agriculture, and the National Oceanic and  
32 Atmospheric Administration. Along with several other ORD programs, the Sustainable and  
33 Healthy Communities program will partner with the Department of the Army in the Net Zero  
34 Initiative, specifically contributing to the development and demonstration of innovative waste  
35 management technologies, consistent with the program's own goals in waste and materials  
36 management. Such collaborations between federal agencies increase efficiency and should  
37 continue to be encouraged.

### 38 **3.4. Chemical Safety for Sustainability**

39 ORD's strategic research action plan for Chemical Safety for Sustainability (U.S. EPA 2012b)  
40 identifies the following problem statement, vision, and policy relevant research themes. Table 5  
41 provides an overview of the requested budget for the Air, Climate and Energy program.  
42

**Sustainable and Healthy Communities: problem statement, vision and themes**

Problem statement: *Although chemicals are essential to modern life, we lack innovative, systematic, effective, and efficient approaches and tools to inform decisions that reduce the environmental and societal impacts of chemicals while increasing economic value.*

Vision: *EPA science will lead the sustainable development, use, and assessment of chemicals by developing and applying integrated chemical evaluation strategies and decision support tools.*

Policy-relevant research themes:

*The CSS program identified three research areas (developing the scientific knowledge, tools, and models needed to conduct integrated, timely, and efficient chemical evaluations; improving methods for assessment and informing management for chemical safety and sustainability; and providing targeted high-priority research solutions for immediate and focused attention). The program also identified eight research themes:*

- *Inherency*
- *Systems Models*
- *Biomarkers*
- *Cumulative Risk*
- *Life Cycle Considerations*
- *Extrapolation*
- *Dashboards*
- *Evaluation*

Table 5: Budget overview for the Chemical Safety for Sustainability Program

Dollar totals may not add exactly due to rounding.

Program/Project	FY 2011 Actuals		FY 2012 Enacted		FY 2013 Pres Bud		Change from 2012 to 2013	
	\$M	FTE	\$M	FTE	\$M	FTE	\$M	FTE
Endocrine Disruptors	\$10.7		\$16.9		\$16.3		(\$0.6)	
Computational Toxicology	\$22.4		\$21.2		\$21.3		\$0.1	
Other Research	\$52.1		\$53.7		\$56.7		\$3.0	
Chemical Safety for Sustainability Research	\$89.2	284.1	\$91.7	291.2	\$94.2	293.5	\$2.5	2.3

How well will the requested budget permit the EPA to advance its strategic research directions as reflected in Chemical Safety for Sustainability Strategic Research Action Plan and the priorities identified in the President’s Budget? Are there any areas where the EPA should increase investments or reduce investments, based on demonstrated accomplishments or clearly identified needs?

The requested budget will allow the EPA to advance its strategic research directions. Given the current fiscal climate, the President’s budget request for a 2.7 percent increase from the FY 2012 enacted budget to \$94.2M in FY 2013 seems reasonable. The President’s Budget also requests an increase of 2.3 FTE over the FY2012 enacted for a total of 293.5 FTE in the FY 2013 President’s budget request. This research program is important to the EPA’s core mission, which requires

1 evaluation of the potential impacts on human health and the environment of thousands of  
2 chemicals in existence and being developed. It is desirable to move away from animal testing  
3 when feasible by using computational toxicology and predicted inherency (i.e., the physical,  
4 chemical and biological properties of a chemical that influence exposure, effects and  
5 sustainability). This research program can also advance two other priorities: advances in  
6 cumulative risk assessment and sustainability through identifying chemicals with safer or more  
7 sustainable properties.

8  
9 Are the changes since the FY 2012 enacted budget appropriate, taking into consideration overall  
10 resources, FTEs, and intramural and extramural resources?

11  
12 Within the requested budget for this program, the requested changes from the FY 2012 enacted  
13 budget appear reasonable and reflect informed trade-offs across research activities. The SAB  
14 supports the requested increase of \$4.1M for sustainable molecular design. ORD and the  
15 Chemical Safety for Sustainability program in particular have a major role in sustainability  
16 research. Because this program area has high visibility and importance, delivering well-  
17 conducted research products on a timely basis is critical and should help both private and public  
18 entities move towards sustainability. Sustainable molecular design research will also provide  
19 results to use in delivering other ORD research outputs.

20  
21 There are two significant requested reductions within this research program. The President's FY  
22 2013 requested budget identifies a reduction of \$0.6M for nanomaterial properties and life-cycle  
23 assessment. ORD has a role in nanotechnology, and identifying the fate of nanomaterials in the  
24 environment as a niche for the EPA is reasonable, given the other federal agencies funding  
25 development of nanotechnology applications.<sup>3</sup> Understanding the way nanomaterials behave in  
26 the environment is critical for evaluating ecosystem and public health risks. The President's  
27 budget also identifies a reduction of \$0.7M for efforts to evaluate real world exposures to  
28 endocrine disrupting chemicals for humans and wildlife. Reduced resources in these areas will  
29 delay research outputs. Completing the work for nanomaterials and endocrine disrupting  
30 chemicals is important, since the Chemical Safety for Sustainability program provides key  
31 information on the toxicity of chemicals and their other chemical properties for use in risk  
32 assessment. The need to prioritize resources, however, is understandable given the fiscal climate,  
33 but the delays in these two programs are regrettable. [Does the workgroup want to say something  
34 stronger here? Text prepared by the HHRA group (which fits more appropriately  
35 programmatically here) took issue with the lack of funding.]

36  

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<sup>3</sup> The National Institutes of Health promotes nanotechnology development through a comprehensive research program within the National Institute of Biomedical Imaging and Bioengineering (NIBIB) (<http://www.nibib.nih.gov/Research/ProgramAreas>), and there are currently several open Requests for Proposal on nanotechnology development for therapeutics (<http://grants.nih.gov/grants/guide/pa-files/PA-11-148.html>, <http://grants.nih.gov/grants/guide/pa-files/PA-11-149.html>, <http://grants.nih.gov/grants/guide/pa-files/PA-10-1286.html>, <http://grants.nih.gov/grants/guide/pa-files/PA-10-149.html>, <http://grants.nih.gov/grants/guide/pa-files/PA-11-159.html>). Similarly, Dept. of Defense has an entire program devoted to the development of nano-based technologies for warfare (<http://www.nano.gov/node/144>).

1 Are there well-defined objectives/work products for next year's budget? Can these  
2 objectives/work products be achieved with the given resources?

3  
4 There is one output identified in the strategic research action plan for FY 2012 (Approaches for  
5 standardized testing of nanomaterials) and three outputs identified for FY 2013 [1) Prioritization  
6 of regulatory chemical inventories based on in vitro molecular signatures (patterns of response)  
7 for endpoints of cancer, developmental toxicity, reproductive toxicity; 2) Quantify acute toxicity  
8 of selected nanomaterials; and 3) Data, methods, and science to inform PCB exposure and  
9 mitigate risk to children to support EPA regional decisions]. Assuming the FY2012 outputs are  
10 met, the requested resources for FY2013 should be sufficient.

11  
12 It is less clear if the resources are sufficient to be able to complete progress towards all the  
13 outputs identified in the strategic research action plan. The Chemical Safety for Sustainability  
14 program has 107 outputs scheduled to be completed by FY 2017. Seventy-eight (73%) are to be  
15 completed in FY 2016. These are ambitious targets, but the program seems to have processes in  
16 place to take into consideration the needs of its partners and customers, to monitor progress and  
17 to identify scientific, management, or resource issues that may hinder the successful completion  
18 of these outputs.

19  
20 Two well-defined outputs that merit special comment are related to Theme 7 (Dashboards) and  
21 Theme 8 (Evaluation). The strategic research action plan describes dashboards as interactive  
22 websites that “provide partners with accessible, useful graphical depictions of all available  
23 chemical data (e.g., information and studies) related to the user’s specific queries to help answer  
24 the chemical-related question.” The evaluation theme identifies the following desired outcomes:  
25 “initial and follow up Pro forma surveys of program office, regional and external partners” and  
26 “A program office and regional partners outreach and engagement plan.” The SAB commends  
27 the Chemical Safety for Sustainability program for these themes, which respond to the SAB and  
28 ORD Board of Scientific Counselors’ concerns (U.S. EPA SAB 2011a, 2011b) that “there is no  
29 proactive budget initiative to develop ways of employing the results of the CSS program,  
30 including high throughput data, into hazard or risk assessment.”

31  
32 Activities related to these themes are important to the success of the Chemical Safety for  
33 Sustainability program. The SAB welcomes additional detail about these activities at future  
34 discussions of ORD strategic research directions. Of special interest is the design of Dashboards  
35 being developed for intended users and the information in the strategic research action plan does  
36 not describe them in detail. Will the Dashboards include data from new approaches for  
37 developing toxicity information, including new information related to chemical/physical  
38 properties related to “inherency”? How will the quality or accuracy of those data will be  
39 characterized? How will Dashboards be made available to clients and stakeholders and users  
40 other federal agencies, states and territories, academia, and the general public? These questions  
41 are of special interest to the SAB and have budget implications.

42

1 Are there opportunities to leverage the EPA resources with other resources, particularly federal  
 2 resources?

3  
 4 The Chemical Safety for Sustainability program appears to be coordinating and partnering within  
 5 the EPA and other federal agencies as well as other public and private entities. The SAB advises  
 6 the program to continue and expand this coordination and leveraging of resources at every  
 7 opportunity.

8 **3.5. Human Health Risk Assessment**

9 ORD’s strategic research action plan for Human Health Risk Assessment (U.S. EPA 2012d)  
 10 identifies the following problem statement, vision, and policy relevant research themes. Table 6  
 11 provides an overview of the requested budget this program.  
 12

<b>Sustainable and Healthy Communities: problem statement, vision and themes</b>
<u>Problem statement:</u> <i>EPA’s decisions must be based on scientifically-defensible evaluation of data that are relevant to assessing human health impacts. The current demand for human health assessments of individual chemicals and chemical mixtures is not being fully met.</i>
<u>Vision:</u> <i>The HHRA research program will generate timely, credible human health assessments of individual chemicals and chemical mixtures to support priority EPA risk management decisions, thereby enabling EPA to better predict and prevent risk.</i>
<u>Policy-relevant research themes:</u>
<ul style="list-style-type: none"> <li>• <i>Integrated Risk Information System (IRIS) health hazard and dose-response assessments;</i></li> <li>• <i>Integrated Science Assessments (ISAs) of criteria air pollutants;</i></li> <li>• <i>Community Risk and Technical Support (CRTS) for exposure and health assessments; and</i></li> <li>• <i>Modernizing Risk Assessment Methods (Methods).</i></li> </ul>

13  
 14

15 **Table 6: Budget overview for the Human Health Risk Assessment Program**

16 Dollar totals may not add exactly due to rounding.

Program/Project	FY 2011 Actuals		FY 2012 Enacted		FY 2013 Pres Bud		Change from 2012 to 2013	
	\$M	FTE	\$M	FTE	\$M	FTE	\$M	FTE
Human Health Risk Assessment (Science and Technology account)	\$46.1		\$39.3		\$40.5		\$0.9	
Human Health Risk Assessment (Non Science and Technology account)	\$3.7		\$3.3		\$3.3		0	
<b>Human Health Risk Assessment Totals</b>	<b>\$49.9</b>	<b>196.6</b>	<b>\$42.9</b>	<b>193.4</b>	<b>\$43.8</b>	<b>195.9</b>	<b>\$0.9</b>	<b>2.5</b>

17  
 18 How well will the requested budget permit the EPA to advance its strategic research directions as  
 19 reflected in HHRA Strategic Research Action Plan and the priorities identified in the President’s  
 20 Budget? Are there any areas where the EPA should increase investments or reduce investments,  
 21 based on demonstrated accomplishments or clearly identified needs?  
 22

1 The President’s budget requests a 2 percent increase from the FY 2012 enacted budget to  
2 \$43.8M in FY 2013 and 2.5 additional FTEs. The requested 2013 budget allows ORD to  
3 maintain its strategic directions but not advance them. The last two years have seen relatively flat  
4 budgets for this program, although more work is expected, given the need to incorporate  
5 expected outputs from the Chemical Safety and Sustainability Program. The SAB has  
6 emphasized the need to invest in modernizing the human risk assessment approach to move  
7 beyond the one-pollutant-at-a-time framework (U.S. EPA 2011b). It is encouraging to see that  
8 the President’s Budget addresses the issue of mixtures and multi-pollutant assessment  
9 approaches, however, it is unclear how innovation and modernization of the risk assessment  
10 program will be achieved. The complex computational toxicology and Tox21 tools will  
11 ultimately need to be applied by the Human Health Risk Assessment program. Streamlining of  
12 the Integrated Risk Information System process will bring some efficiencies, but given the  
13 limited information provided to the SAB, it is difficult to assess whether the modernization effort  
14 will get the attention it warrants. As the SAB noted in the budget review last year, such  
15 modernization is critically important. A tight partnership between the Human Health Risk  
16 Assessment program and the Chemical Safety for Sustainability program is necessary for  
17 success.

18  
19 Are the changes since the FY 2012 enacted budget appropriate, taking into consideration overall  
20 resources, FTEs, and intramural and extramural resources?

21  
22 The Human Health Risk Assessment program makes key contributions to the EPA’s strategic  
23 goals, but requested funding would be reduced for some activities. These reductions may cause  
24 delays in final products. There would be a \$0.3M reduction for generating Integrated Science  
25 Assessments supporting National Ambient Air Quality Standard reviews, including the multi-  
26 pollutant Integrated Science Assessment for nitrogen oxides and sulfur oxides and a \$0.4M  
27 reduction for methods and model development. Because some of the wording in the strategic  
28 research action plans and President’s Budget is vague, it is not clear whether some initiatives are  
29 in need of new or increasing funds or how much flexibility there is for addressing emerging risk  
30 assessment issues. [HHRA bullets on EDCs and nano were edited and moved to the CSS section  
31 and flagged for discussion there]

32  
33 The continual monitoring and compilation of the literature on human health and ecological  
34 effects through Health and Environmental Research Online (HERO) project should provide a  
35 mechanism to ensure that the EPA is aware of major findings that would have a substantial effect  
36 on the standard-setting process.

37  
38 Are there well-defined objectives/work products for next year’s budget? Can these  
39 objectives/work products be achieved with the given resources?

40  
41 The objectives for this program are focused and limited but significant. There are well-defined  
42 work products for FY 2013 for the Integrated Risk Information System and Integrated Science  
43 Assessments. The basic work can continue with the current budget, but it is not clear how new  
44 work (e.g., on chemical mixtures) can be initiated with a flat budget. Products for risk  
45 assessment modernization are less clear, and as a result, this work could be neglected as  
46 deadlines for other products lead to those activities receiving more attention. Furthermore, it is

1 not clear how the Human Health Risk Assessment program will incorporate the findings from the  
 2 Chemical Safety for Sustainability program into risk assessments. This new activity may be  
 3 potentially expensive initially. Given the flat budget and no shortage of chemicals to assess, the  
 4 SAB is concerned that the more innovative work on multiple chemicals and high throughput  
 5 analysis results will suffer.

6  
 7 Are there opportunities to leverage the EPA resources with other resources, particularly federal  
 8 resources?

9  
 10 As noted above, the partnership with the Chemical Safety for Sustainability program needs to be  
 11 very tight and there is also a need to coordinate closely with the Air, Climate and Energy  
 12 program regarding Integrated Science Assessments supporting National Ambient Air Quality  
 13 Standards. The Human Health Risk Assessment needs fluid collaboration and interactions with  
 14 each of the other ORD programs. This should be a prime example of the implementation of  
 15 systems thinking at ORD.

16 **3.6. Homeland Security**

17 ORD’s strategic research action plan for Homeland Security (U.S. EPA 2012c) identifies the  
 18 mission and policy relevant research themes. Table 7 provides an overview of the requested  
 19 budget this program.  
 20

<b>Homeland Security: mission and themes</b>
<p><i>Mission: The U.S. Environmental Protection Agency (EPA) has a responsibility to help communities prepare for and recover from disasters, including acts of terrorism. EPA’s role includes helping to protect water systems from attack, assisting water utilities to build contamination warning and mitigation systems, and leading remediation of contaminated indoor and outdoor settings and water infrastructure. Critical science gaps exist in all these areas. EPA’s Homeland Security Research Program (HSRP) was established to conduct applied research and provide technical support that increases the capability of EPA to achieve its homeland security responsibilities. The HSRP helps build systems-based solutions by working with Agency partners to plan, implement and deliver useful science and technology products.</i></p> <p><u>Policy-relevant research themes:</u></p> <ul style="list-style-type: none"> <li>• <i>Securing and Sustaining Water Systems</i></li> <li>• <i>Characterizing Contamination and Determining Risk</i></li> <li>• <i>Remediating Indoor and Outdoor Environments.</i></li> </ul>

21  
 22  
 23 **Table 7: Budget overview for the Homeland Security Program**

24  
 25 ORD actual are unavailable in source document  
 (Budget in Brief), so enacted totals are noted here.

Program/Project	FY 2011 Enacted		FY 2012 Enacted		FY 2013 Pres Bud		Change from 2012 to 2013	
	\$M	FTE	\$M	FTE	\$M	FTE	\$M	FTE
Homeland Security Research	\$26.7	64.3	\$26.6	64.1	\$26.4	64.7	-\$0.2	0.6

1 How well will the requested budget permit the EPA to advance its strategic research directions as  
2 reflected in the Homeland Security Strategic Research Action Plan and the priorities identified in  
3 the President’s Budget? Are there any areas where the EPA should increase investments or  
4 reduce investments, based on demonstrated accomplishments or clearly identified needs?  
5

6 The President’s budget request identifies a 0.1 percent reduction from the FY 2012 enacted  
7 budget to \$26.4M in FY 2013 and 0.7 additional FTEs. This represents a decrease in extramural  
8 funding for this program two years in a row. The requested budget will permit the EPA to  
9 advance much of the strategic research identified in the strategic plan.  
10

11 The President’s Budget narrative states that the Homeland Security Research Program will re-  
12 envision research so that science products have application to a broad set of disasters that could  
13 be related to terrorism, the result of accidents, or natural disaster. The strategic research action  
14 plan and research investments are primarily focused on “remediation science.” This focus on  
15 remediation science has been at the expense of the Homeland Security program repositioning  
16 research towards developing science to support resilient infrastructure and communities better  
17 adapt to extreme perturbations caused by disasters. Budget cuts make developing this science a  
18 more difficult challenge.  
19

20 Dissemination of knowledge and products to the states and communities should remain a high  
21 priority for the Homeland Security program. However, no information was provided on specific  
22 allocation of resources to this effort.  
23

24 Are the changes since the FY 2012 enacted budget appropriate, taking into consideration overall  
25 resources, FTEs, and intramural and extramural resources?  
26

27 The President’s Budget identifies a reduction of \$0.35M in decontamination research, which is  
28 appropriate considering the maturation of this research effort. In contrast, though the water  
29 quality program has demonstrated an ability to produce quality and useful products for users, the  
30 President’s Budget only identifies an increase of \$0.16M for the water security program and an  
31 increase of only 1.1 FTE.  
32

33 Are there well-defined objectives/work products for next year’s budget? Can these  
34 objectives/work products be achieved with the given resources?  
35

36 The President’s Budget identifies a number of important objectives and work products for FY  
37 2013. There is every reason to think that these are achievable given the historical successes of  
38 the Homeland Security program and the requested budget, given the limited information  
39 provided. The President’s Budget, however, does mention that Homeland Security program will  
40 focus research to address managing large volumes of contaminated food and agricultural wastes  
41 and the need to sample and analyze this waste. The SAB cautions that taking on additional  
42 responsibilities at a time that the Homeland Security program is experiencing budget reductions  
43 requires careful management attention. This new activity should be leveraged with resources  
44 from agencies such as U.S. Department of Agriculture and the Food and Drug Administration.  
45

1 Are there opportunities to leverage the EPA resources with other resources, particularly federal  
2 resources?

3  
4 The disaster-response research community has investigated the question of resilient communities  
5 from a social science perspective (Morrow, 2008; Norris 2010, Twigg 2009, UN 2007). The  
6 SAB advises the Homeland Security program to engage with that group of research scholars and  
7 the governmental (e.g., the Federal Emergency Management Agency) and nongovernmental  
8 entities (e.g., Community and Regional Resilience Institute (CARRI), and others, making use of  
9 their findings.

10  
11 The Homeland Security Program has partnerships with the Department of Homeland Security  
12 and Department of Defense. The Homeland Security program should prioritize methods to  
13 disseminate relevant knowledge generated by these partner organizations to users more closely  
14 affiliated with the EPA.

### 15 3.7. Economics and Decision Science

16 The Office of Policy did not provide a strategic research action plan for Economic and Decision  
17 Science research program. Instead, it provided the mission statements below and a program  
18 overview which identified activities of the program. Table 8 provides an overview of the  
19 requested budget this program.  
20

#### **NCEE and the Economics and Decision Science Research Program**

NCEE Mission: *The mission of EPA’s National Center for Environmental Economics (NCEE) is to contribute to better environmental decision-making by advancing the theory and practice of economics and risk analysis within the Agency. NCEE achieves its research mission by conducting, supporting, and applying research in environmental economics and environmental science, with a focus on human and ecosystem health; and improving economic analysis and risk assessment by identifying better ways to link the social and natural sciences.*

Economic and Decision Science Program: *The STAR Economics and Decision Sciences (EDS) research program supports research by external social scientists that environmental decision-makers can use in real-world situations. The EDS program assists EPA in estimating costs and benefits of proposed actions, identifies costs savings of non-regulatory approaches, and assists in optimizing the use of its enforcement compliance resources.*

21

Table 8: Budget overview of the Economics and Decision Science Program

Dollar totals may not add up because of rounding.

	FY 2007 Enacted	FY 2008 Enacted	FY 2009 Enacted	FY 2010 Enacted	FY 2011 Enacted	2012 (estimate)	FY 2013 Pres Bud
EDS - extramural \$	\$2.3M <sup>#</sup>	-	-	\$1.2M	\$0.5M	-	\$1.0M
NCEE - research, funded with extramural \$	\$0.2M	\$0.7M	\$0.2M	\$0.6M	\$1.9M	TBD	\$2.0M
NCEE other program support, funding with extramural \$	\$2.7M	\$1.6M	\$1.3M	\$2.0M	\$1.0M	TBD	\$2.0M
Total	2.5M	0.7M	0.2M	1.8M	2.4M	TBD	3.0M
NCEE staff (# FTEs)*	35	38	36	36	32	32	32
Total	2.5M	0.7M	0.2M	1.8M	2.4M	TBD	3.0M

Notes:

<sup>#</sup> 2007 funding provided by ORD. Figures in subsequent years are funds provided as part of NCEE's budget.

\* Staff with technical background in economics or other science field. Majority of technical staff (~85%) are economists – no major changes in distribution between 2007-2013.

How well will the requested budget permit the EPA to advance its strategic research directions as reflected in Economic and Decision Science program overview and the priorities identified in the President's Budget? Are there any areas where the EPA should increase investments or reduce investments, based on demonstrated accomplishments or clearly identified needs?

As indicate above, NCEE provided a mission statement but did not provide specific strategic research objectives. It also provided a list of ongoing research projects for the Economics and Decision Science Research Program and other activities conducted by NCEE staff.

Funding for economics and decision science is not adequate to advance our understanding of the many important research questions faced by the EPA in this area. The President's budget request of \$3 million is very modest, and far from adequate for advancing economics and decision science research sufficiently to support EPA needs. The President's request, however, is a significant improvement over funding levels in recent years, and is at least useful for advancing the narrow purposes for which this funding has been used—to help fund workshops, provide supplementary funding for dissertation research and to provide early career grants. These funds are able to achieve as much as they do only because they are effectively leveraged with other funds, which makes this a very good investment of modest public funds.

The NCEE Program Overview indicates that activities involve much more economics than decision science. The SAB observes there are good opportunities for collaboration of economists and other decision scientists in many of these projects. For example, one very important project

1 is trying to understand why consumers and firms under invest in energy saving technologies that  
2 appear to be very good investments. By reducing energy use, such investments also reduce  
3 emissions and help protect the environment. Hence, it is important for the EPA to understand  
4 why consumers and businesses fail to take advantage of low cost opportunities to reduce energy  
5 expenditures.

6  
7 Social and behavioral scientists with training and experience in this area could make a valuable  
8 contribution to a project such as this. For example, there is a large literature in decision sciences  
9 on behavior change that identifies barriers to change and develops strategies for overcoming  
10 barriers. Given the resources, a team of economists and decision scientists would make important  
11 advances in our understanding of how to design cost-effective (indeed, negative cost) strategies  
12 for reducing pollution emissions through behavior change.

13  
14 The SAB notes that since 2005 no funding has been provided for the Pollution Abatement Costs  
15 and Expenditures (PACE) survey that collects data on overall pollution abatement expenditures  
16 from over 20,000 manufacturing facilities. The EPA has used PACE data in some regulatory  
17 analyses (citations?) and for periodic reports on national or program costs (U.S. EPA 2011,  
18 citations?). Government and academic researchers also rely upon PACE data, using it to analyze  
19 the impact of environmental regulations on important economic and environmental outcomes  
20 (e.g., job growth; competitiveness; environmental performance; opening and closing of  
21 manufacturing facilities; and productivity growth). This is an especially important research  
22 direction for the EPA since it not only contributes to essential analyses required to assess the  
23 economic effects of proposed regulations, but also can be used to better understand how the EPA  
24 can improve the design of future regulations so that they are both effective in meeting  
25 environmental goals and are less burdensome to industry.

26  
27 Are the changes since the FY 2012 enacted budget appropriate, taking into consideration overall  
28 resources, FTEs, and intramural and extramural resources?

29  
30 The increase in extramural funding estimated for 2013 (a 33 percent increase from the FY 2011  
31 enacted budget to \$3.0M for FY 2013) is appropriate and will restore stability to an important  
32 EPA research program. This is a good investment of public funds especially since most of the  
33 external funds are well leveraged.

34  
35 Human systems are the primary drivers of the environmental challenges that the EPA is charged  
36 with managing. The EPA regulatory actions focus primarily on changing the behavior of human  
37 systems in order to protect the environment. As a consequence, effective environmental  
38 management requires a thorough understanding of how humans systems operate, and how to  
39 design regulations to effectively manage human systems. Research on economics and decision  
40 sciences is essential to meeting this challenge, and SAB recommends that research should be a  
41 higher priority and with more substantial funding.

1 Are there well defined objectives/work products for next year’s budget? Can these be  
2 accomplished with the given resources?

3  
4 The documents provided to the SAB did not provide a set of strategic research objectives, but  
5 rather provided a list of work products, including work products that are just starting up or that  
6 are ongoing through 2013. Externally funded projects are mostly workshops, dissertation grants  
7 and funding for early career research. The primary purpose is to help build capabilities of the  
8 next generation of researchers, although ORD also capitalizes on the findings of these research  
9 activities (especially by participating in workshops). But the funded projects are not tied to  
10 specific ORD research objectives and work products.

11  
12 The extramural resources are very modest, but they can be of some help advancing research in  
13 this area. Many important internal research projects are being carried out, and this research is  
14 well tied to the NCEE mission.

15 .  
16 Are there opportunities to leverage the EPA resources with other resources, particularly federal  
17 resources?

18  
19 The SAB notes that cooperative research across the EPA’s research programs is essential to  
20 meeting research goals. Although many of the ORD Research Programs identify the need for  
21 social, behavior and economic sciences, the SAB understands that there is little coordination  
22 between the National Center for Environmental Economics and ORD’s Research Programs. For  
23 example, SAB understands that the NCEE does not participate in ORD’s strategic research  
24 planning other than discussions with the Sustainable and Healthy Communities research program  
25 on selected ecological valuation topics. Coordination between ORD and NCEE is essential for  
26 meeting the research objectives with tightly constrained budgets.

27  
28 Many agencies outside of the EPA face similar problems in assessing costs and benefits of  
29 actions, including non-market benefits, including Natural Resource Damage Assessments work  
30 by National Oceanic and Atmospheric Administration, U.S. Department of Agriculture research  
31 on ecosystem services, the National Science Foundation, the Army Corps of Engineers, etc.  
32 There are many opportunities for leveraging funds for research on valuing ecosystem services,  
33 both within ORD (e.g., with the Sustainable and Healthy Communities Program) and outside of  
34 ORD, and these should be actively pursued.

35  
36

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