

112TH CONGRESS  
1ST SESSION

# H. R. 2396

To authorize the Administrator of the Environmental Protection Agency to award grants for electronic device recycling research, development, and demonstration projects, and for other purposes.

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## IN THE HOUSE OF REPRESENTATIVES

JUNE 24, 2011

Mr. SARBANES (for himself, Mr. WU, Ms. EDDIE BERNICE JOHNSON of Texas, and Mr. CLARKE of Michigan) introduced the following bill; which was referred to the Committee on Science, Space, and Technology

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## A BILL

To authorize the Administrator of the Environmental Protection Agency to award grants for electronic device recycling research, development, and demonstration projects, and for other purposes.

1       *Be it enacted by the Senate and House of Representa-*  
2       *tives of the United States of America in Congress assembled,*

3       **SECTION 1. SHORT TITLE.**

4       This Act may be cited as the “Electronic Device Re-  
5       cycling Research and Development Act”.

6       **SEC. 2. FINDINGS.**

7       Congress finds the following:

1           (1) The volume of electronic devices in the  
2 United States is substantial and will continue to  
3 grow. The Environmental Protection Agency esti-  
4 mates that over 2 billion computers, televisions,  
5 wireless devices, printers, gaming systems, and other  
6 devices have been sold since 1980, generating 2 mil-  
7 lion tons of unwanted electronic devices in 2005  
8 alone.

9           (2) Electronic devices can be recycled or refur-  
10 bished to recover and conserve valuable materials,  
11 such as gold, copper, and platinum. However, ac-  
12 cording to the Environmental Protection Agency,  
13 only 15 to 20 percent of electronic devices discarded  
14 from households reach recyclers.

15           (3) The electronic device recycling industry in  
16 the United States is growing; however, challenges re-  
17 main for the recycling of electronic devices by house-  
18 holds and other small generators. Collection of such  
19 electronic devices is expensive, and separation and  
20 proper recycling of some of the materials recovered,  
21 like lead from cathode-ray tube televisions, is costly.

22           (4) The export of unwanted electronic devices  
23 to developing countries also presents a serious chal-  
24 lenge. The crude methods of many of the recycling  
25 operations in these countries can expose workers to

1 harmful chemicals, jeopardizing their health and pol-  
2 luting the environment.

3 (5) Some of the challenges to increasing the  
4 recyclability of electronic devices can be addressed  
5 by improving the logistics and technology of the col-  
6 lection and recycling process, designing electronic  
7 devices to avoid the use of hazardous materials and  
8 to be more easily recycled, and encouraging the use  
9 of recycled materials in more applications.

10 (6) The public currently does not take full ad-  
11 vantage of existing electronic device recycling oppor-  
12 tunities. Studying factors that influence behavior  
13 and educating consumers about responsible elec-  
14 tronic device recycling could help communities and  
15 private industry develop recycling programs that  
16 draw more participation.

17 (7) The development of tools and technologies  
18 to increase the lifespan of electronic devices and to  
19 promote their safe reuse would decrease the impact  
20 of the production of electronic devices on the envi-  
21 ronment and likely increase the recyclability of such  
22 devices.

23 (8) Accurately assessing the environmental im-  
24 pacts of the production of electronic devices and the  
25 recycling of such devices is a complex task. Data,

1 tools, and methods to better quantify these impacts  
2 would help policymakers and others determine the  
3 best end-of-life management options for electronic  
4 devices.

5 **SEC. 3. ELECTRONIC DEVICE ENGINEERING RESEARCH,**  
6 **DEVELOPMENT, AND DEMONSTRATION**  
7 **PROJECTS.**

8 (a) IN GENERAL.—The Administrator shall award  
9 multiyear grants to consortia to conduct research to create  
10 innovative and practical approaches to manage the envi-  
11 ronmental impacts of electronic devices and, through the  
12 conduct of this research, to contribute to the professional  
13 development of scientists, engineers, and technicians in  
14 the fields of electronic device manufacturing, design, re-  
15 furbishing, and recycling. The grants awarded under this  
16 section shall support research to—

17 (1) increase the efficiency of and improve elec-  
18 tronic device collection and recycling;

19 (2) expand the uses and applications for mate-  
20 rials recovered from electronic devices;

21 (3) develop and demonstrate environmentally  
22 friendly alternatives to the use of hazardous and po-  
23 tentially hazardous materials in electronic devices  
24 and the production of such devices;

1           (4) develop methods to identify, separate, and  
2           remove hazardous and potentially hazardous mate-  
3           rials from electronic devices and to reuse, recycle, or  
4           dispose of such materials in a safe manner;

5           (5) reconsider product design and assembly to  
6           facilitate and improve refurbishment, reuse, and re-  
7           cycling of electronic devices, including an emphasis  
8           on design for recycling;

9           (6) conduct lifecycle analyses of electronic de-  
10          vices, including developing tools and methods to as-  
11          sess the environmental impacts of the production,  
12          use, and end-of-life management of electronic devices  
13          and electronic device components;

14          (7) develop product design, tools, and tech-  
15          niques to extend the lifecycle of electronic devices,  
16          including methods to promote their upgrade and  
17          safe reuse; and

18          (8) identify the social, behavioral, and economic  
19          barriers to recycling and reuse for electronic devices  
20          and develop strategies to increase awareness, con-  
21          sumer acceptance, and the practice of responsible re-  
22          cycling and reuse for such devices.

23          (b) MERIT REVIEW; COMPETITION.—Grants shall be  
24          awarded under this section on a merit-reviewed, competi-  
25          tive basis.

1 (c) APPLICATIONS.—A consortium shall submit an  
2 application for a grant under this section to the Adminis-  
3 trator at such time, in such manner, and containing such  
4 information and assurances as the Administrator may re-  
5 quire. The application shall include a description of—

6 (1) the research project that will be undertaken  
7 by the consortium and the contributions of each of  
8 the participating entities, including the for-profit en-  
9 tity;

10 (2) the applicability of the project to reduce im-  
11 pediments to electronic device recycling in the elec-  
12 tronic device design, manufacturing, refurbishing, or  
13 recycling industries;

14 (3) the potential for and feasibility of incor-  
15 porating the research results into industry practice;  
16 and

17 (4) how the project will promote collaboration  
18 among scientists and engineers from different dis-  
19 ciplines, such as electrical engineering, materials  
20 science, and social science.

21 (d) DISSEMINATION OF RESEARCH RESULTS.—Re-  
22 search results shall be made publicly available through—

23 (1) development of best practices or training  
24 materials for use in the electronic device manufac-  
25 turing, design, refurbishing, or recycling industries;

1           (2) dissemination at conferences affiliated with  
2 such industries;

3           (3) publication on the Environmental Protection  
4 Agency's Web site;

5           (4) demonstration projects; or

6           (5) educational materials for the public pro-  
7 duced in conjunction with State governments, local  
8 governments, or nonprofit organizations on problems  
9 and solutions related to electronic device recycling  
10 and reuse.

11       (e) FUNDING CONTRIBUTION FROM FOR-PROFIT  
12 MEMBER OF CONSORTIUM.—The for-profit entity partici-  
13 pating in the consortium shall contribute at least 10 per-  
14 cent of the total research project cost, either directly or  
15 with in-kind contributions.

16       (f) PROTECTION OF PROPRIETARY INFORMATION.—  
17 The Administrator—

18           (1) shall not disclose any proprietary informa-  
19 tion or trade secrets provided by any person or enti-  
20 ty pursuant to this section;

21           (2) shall ensure that, as a condition of receipt  
22 of a grant under this section, each member of the  
23 consortium has in place proper protections to main-  
24 tain proprietary information or trade secrets contrib-  
25 uted by other members of the consortium; and

1           (3) if any member of the consortium breaches  
2           the conditions under paragraph (2) or discloses pro-  
3           prietary information or trade secrets, may require  
4           the return of any funds received under this section  
5           by such member.

6           (g) BIENNIAL REPORT.—Within 2 years after the  
7           date of enactment of this Act, and every 2 years there-  
8           after, the Administrator shall transmit to Congress a re-  
9           port that provides—

10           (1) a list of the grants awarded under this sec-  
11           tion;

12           (2) the entities participating in each consortium  
13           receiving a grant;

14           (3) a description of the research projects car-  
15           ried out in whole or in part with funds made avail-  
16           able under such a grant;

17           (4) the results of such research projects; and

18           (5) a description of the rate and success of the  
19           adoption or integration of such research results into  
20           the manufacturing processes, management practices,  
21           and products of the electronics industry.

22           (h) AUTHORIZATION OF APPROPRIATIONS.—There  
23           are authorized to be appropriated to the Administrator to  
24           carry out this section:

25           (1) \$18,000,000 for fiscal year 2012.



1 (2) \$20,000,000 for fiscal year 2013.

2 (3) \$22,000,000 for fiscal year 2014.

3 **SEC. 4. NATIONAL ACADEMY OF SCIENCES REPORT ON**  
4 **ELECTRONIC DEVICE RECYCLING.**

5 (a) IN GENERAL.—In order to better recognize gaps  
6 and opportunities in the research and training programs  
7 established in this Act, the Administrator shall enter into  
8 an arrangement with the National Academy of Sciences  
9 for a report, to be transmitted to Congress not later than  
10 1 year after the date of enactment of this Act, on—

11 (1) opportunities for and barriers to—

12 (A) increasing the recyclability of elec-  
13 tronic devices, specifically addressing—

14 (i) recycling or safe disposal of elec-  
15 tronic devices and low value materials re-  
16 covered from such devices;

17 (ii) designing electronic devices to fa-  
18 cilitate reuse and recycling; and

19 (iii) the reuse of electronic devices;

20 and

21 (B) making electronic devices safer and  
22 more environmentally friendly, specifically ad-  
23 dressing reducing the use of hazardous mate-  
24 rials and potentially hazardous materials in  
25 electronic devices;

1 (2) the environmental and human health risks  
2 posed by the storage, transport, recycling, and dis-  
3 posal of unwanted electronic devices;

4 (3) the current status of research and training  
5 programs to promote the environmental design of  
6 electronic devices to increase the recyclability of such  
7 devices; and

8 (4) any regulatory or statutory barriers that  
9 may prevent the adoption or implementation of best  
10 management practices or technological innovations  
11 that may arise from the research and training pro-  
12 grams established in this Act.

13 (b) RECOMMENDATIONS.—The report under sub-  
14 section (a) shall identify gaps in the current research and  
15 training programs in addressing the opportunities, bar-  
16 riers, and risks relating to electronic device recycling, and  
17 the report shall recommend areas where additional re-  
18 search and development resources are needed to reduce  
19 the impact of unwanted electronic devices on the environ-  
20 ment.

21 **SEC. 5. ENGINEERING CURRICULUM DEVELOPMENT**  
22 **GRANTS.**

23 (a) GRANT PROGRAM.—The Administrator, in con-  
24 sultation with the Director of the National Science Foun-  
25 dation, shall award grants to institutions of higher edu-

1 cation to develop curricula that incorporates the principles  
2 of environmental design into the development of electronic  
3 devices—

4           (1) for the training of electrical, mechanical, in-  
5           dustrial, manufacturing, materials, and software en-  
6           gineers and other students at the undergraduate and  
7           graduate level; and

8           (2) to support the continuing education of pro-  
9           fessionals in the electronic device manufacturing, de-  
10          sign, refurbishing, or recycling industries.

11          (b) **ELIGIBLE ENTITIES.**—The term “institution of  
12 higher education”, as such term is used with respect to  
13 eligibility to receive a grant under subsection (a)(2), in-  
14 cludes any institution of higher education under section  
15 101(b) of the Higher Education Act of 1965 (20 U.S.C.  
16 1001(b)).

17          (c) **OUTREACH TO MINORITY SERVING INSTITU-**  
18 **TIONS.**—The Administrator shall conduct outreach to mi-  
19 nority serving institutions for the purposes of providing  
20 information on the grants available under this section and  
21 how to apply for such grants.

22          (d) **MERIT REVIEW; COMPETITION.**—Grants shall be  
23 awarded under this section on a merit-reviewed, competi-  
24 tive basis.

1 (e) USE OF FUNDS.—Grants awarded under this sec-  
2 tion shall be used for activities that enhance the ability  
3 of an institution of higher education to broaden the under-  
4 graduate and graduate-level engineering curriculum or  
5 professional continuing education curriculum to include  
6 environmental engineering design principles and consider-  
7 ation of product lifecycles related to electronic devices and  
8 increasing the recyclability of such devices. Activities may  
9 include—

10 (1) developing and revising curriculum to in-  
11 clude multidisciplinary elements;

12 (2) creating research and internship opportuni-  
13 ties for students through partnerships with industry,  
14 nonprofit organizations, or government agencies;

15 (3) creating and establishing certificate pro-  
16 grams; and

17 (4) developing curricula for short courses and  
18 continuing education for professionals in the envi-  
19 ronmental design of electronic devices to increase the  
20 recyclability of such devices.

21 (f) APPLICATION.—An institution of higher education  
22 seeking a grant under this section shall submit an applica-  
23 tion to the Administrator at such time, in such manner,  
24 and with such information and assurances as the Adminis-  
25 trator may require.

1 (g) AUTHORIZATION OF APPROPRIATIONS.—There  
2 are authorized to be appropriated to the Administrator to  
3 carry out this section:

4 (1) \$5,000,000 for fiscal year 2012.

5 (2) \$5,150,000 for fiscal year 2013.

6 (3) \$5,304,000 for fiscal year 2014.

7 **SEC. 6. ENVIRONMENTALLY FRIENDLY ALTERNATIVE MA-**  
8 **TERIALS PHYSICAL PROPERTY DATABASE.**

9 (a) IN GENERAL.—The Director shall establish an  
10 initiative to develop a comprehensive physical property  
11 database for environmentally friendly alternative materials  
12 for use in electronic devices.

13 (b) PRIORITIES.—The Director, working with the  
14 electronic device design, manufacturing, or recycling in-  
15 dustries, shall develop a strategic plan to establish prior-  
16 ities and the physical property characterization require-  
17 ments for the database described in subsection (a).

18 (c) AUTHORIZATION OF APPROPRIATIONS.—There  
19 are authorized to be appropriated to the Administrator to  
20 carry out this section:

21 (1) \$3,000,000 for fiscal year 2012.

22 (2) \$3,000,000 for fiscal year 2013.

23 (3) \$3,000,000 for fiscal year 2014.

24 **SEC. 7. DEFINITIONS.**

25 For the purposes of this Act:

1           (1) ADMINISTRATOR.—The term “Adminis-  
2           trator” means the Administrator of the Environ-  
3           mental Protection Agency.

4           (2) CONSORTIUM.—The term “consortium”  
5           means a grant applicant or recipient under section  
6           3(a) that includes—

7                   (A) at least one institution of higher edu-  
8                   cation, nonprofit research institution, or govern-  
9                   ment laboratory; and

10                   (B) at least one for-profit entity, including  
11                   a manufacturer, designer, refurbisher, or recy-  
12                   cler of electronic devices or the components of  
13                   such devices.

14           (3) DIRECTOR.—The term “Director” means  
15           the Director of the National Institute of Standards  
16           and Technology.

17           (4) ELECTRONIC DEVICE.—The term “elec-  
18           tronic device” may include computers, computer  
19           monitors, televisions, laptops, printers, wireless de-  
20           vices, copiers, fax machines, stereos, video gaming  
21           systems, and the components of these devices.

22           (5) INSTITUTION OF HIGHER EDUCATION.—The  
23           term “institution of higher education” has the  
24           meaning given such term in section 101(a) of the  
25           Higher Education Act of 1965 (20 U.S.C. 1001(a)).

1           (6) MINORITY SERVING INSTITUTION.—The  
2           term “minority serving institution” means an insti-  
3           tution that is an eligible institution under section  
4           371(a) of the Higher Education Act of 1965 (20  
5           U.S.C. 1067q(a)).

○