

113TH CONGRESS  
1ST SESSION

# H. R. 2495

To amend the Department of Energy High-End Computing Revitalization Act of 2004 to improve the high-end computing research and development program of the Department of Energy, and for other purposes.

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## IN THE HOUSE OF REPRESENTATIVES

JUNE 25, 2013

Mr. HULTGREN (for himself, Mr. SWALWELL of California, Ms. MCCOLLUM, Mr. LANGEVIN, Mr. LIPINSKI, Mr. FATTAH, Ms. LOFGREN, Mr. FLEISCHMANN, Mr. ADERHOLT, and Mr. KINZINGER of Illinois) introduced the following bill; which was referred to the Committee on Science, Space, and Technology

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## A BILL

To amend the Department of Energy High-End Computing Revitalization Act of 2004 to improve the high-end computing research and development program of the Department of Energy, 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 “American Super Com-  
5 puting Leadership Act”.

1 **SEC. 2. DEFINITIONS.**

2 Section 2 of the Department of Energy High-End  
3 Computing Revitalization Act of 2004 (15 U.S.C. 5541)  
4 is amended by striking paragraphs (1) through (5) and  
5 inserting the following:

6 “(1) CO-DESIGN.—The term ‘co-design’ means  
7 the joint development of application algorithms,  
8 models, and codes with computer technology archi-  
9 tectures and operating systems to maximize effective  
10 use of high-end computing systems.

11 “(2) DEPARTMENT.—The term ‘Department’  
12 means the Department of Energy.

13 “(3) EXASCALE.—The term ‘exascale’ means  
14 computing system performance at or near 10 to the  
15 18th power floating point operations per second.

16 “(4) HIGH-END COMPUTING SYSTEM.—The  
17 term ‘high-end computing system’ means a com-  
18 puting system with performance that substantially  
19 exceeds that of systems that are commonly available  
20 for advanced scientific and engineering applications.

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

1           “(6) NATIONAL LABORATORY.—The term ‘Na-  
2           tional Laboratory’ means any one of the seventeen  
3           laboratories owned by the Department.

4           “(7) SECRETARY.—The term ‘Secretary’ means  
5           the Secretary of Energy.

6           “(8) SOFTWARE TECHNOLOGY.—The term  
7           ‘software technology’ includes optimal algorithms,  
8           programming environments, tools, languages, and  
9           operating systems for high-end computing systems.”.

10 **SEC. 3. DEPARTMENT OF ENERGY HIGH-END COMPUTING**  
11 **RESEARCH AND DEVELOPMENT PROGRAM.**

12           Section 3 of the Department of Energy High-End  
13           Computing Revitalization Act of 2004 (15 U.S.C. 5542)  
14           is amended—

15           (1) in subsection (a)—

16                   (A) in paragraph (1), by striking “pro-  
17                   gram” and inserting “coordinated program  
18                   across the Department”;

19                   (B) by striking “and” at the end of para-  
20                   graph (1);

21                   (C) by striking the period at the end of  
22                   paragraph (2) and inserting “; and”; and

23                   (D) by adding at the end the following new  
24                   paragraph:

1           “(3) partner with universities, National Labora-  
2           tories, and industry to ensure the broadest possible  
3           application of the technology developed in this pro-  
4           gram to other challenges in science, engineering,  
5           medicine, and industry.”;

6           (2) in subsection (b)(2), by striking “vector”  
7           and all that follows through “architectures” and in-  
8           serting “computer technologies that show promise of  
9           substantial reductions in power requirements and  
10          substantial gains in parallelism of multicore proc-  
11          essors, concurrency, memory and storage, band-  
12          width, and reliability”; and

13          (3) by striking subsection (d) and inserting the  
14          following:

15          “(d) EXASCALE COMPUTING PROGRAM.—

16                 “(1) IN GENERAL.—The Secretary shall con-  
17                 duct a coordinated research program to develop  
18                 exascale computing systems to advance the missions  
19                 of the Department.

20                 “(2) EXECUTION.—The Secretary shall,  
21                 through competitive merit review, establish two or  
22                 more National Laboratory-industry-university part-  
23                 nerships to conduct integrated research, develop-  
24                 ment, and engineering of multiple exascale architec-  
25                 tures, and—

1           “(A) conduct mission-related co-design ac-  
2           tivities in developing such exascale platforms;

3           “(B) develop those advancements in hard-  
4           ware and software technology required to fully  
5           realize the potential of an exascale production  
6           system in addressing Department target appli-  
7           cations and solving scientific problems involving  
8           predictive modeling and simulation and large-  
9           scale data analytics and management; and

10           “(C) explore the use of exascale computing  
11           technologies to advance a broad range of  
12           science and engineering.

13           “(3) ADMINISTRATION.—In carrying out this  
14           program, the Secretary shall—

15           “(A) provide, on a competitive, merit-re-  
16           viewed basis, access for researchers in United  
17           States industry, institutions of higher edu-  
18           cation, National Laboratories, and other Fed-  
19           eral agencies to these exascale systems, as ap-  
20           propriate; and

21           “(B) conduct outreach programs to in-  
22           crease the readiness for the use of such plat-  
23           forms by domestic industries, including manu-  
24           facturers.

25           “(4) REPORTS.—

1           “(A) INTEGRATED STRATEGY AND PRO-  
2           GRAM MANAGEMENT PLAN.—The Secretary  
3           shall submit to Congress, not later than 90  
4           days after the date of enactment of the Amer-  
5           ican Super Computing Leadership Act, a report  
6           outlining an integrated strategy and program  
7           management plan, including target dates for  
8           prototypical and production exascale platforms,  
9           interim milestones to reaching these targets,  
10          functional requirements, roles and responsibil-  
11          ities of National Laboratories and industry, ac-  
12          quisition strategy, and estimated resources re-  
13          quired, to achieve this exascale system capa-  
14          bility. The report shall include the Secretary’s  
15          plan for Departmental organization to manage  
16          and execute the Exascale Computing Program,  
17          including definition of the roles and responsibil-  
18          ities within the Department to ensure an inte-  
19          grated program across the Department. The re-  
20          port shall also include a plan for ensuring bal-  
21          ance and prioritizing across ASCR subprograms  
22          in a flat or slow-growth budget environment.

23          “(B) STATUS REPORTS.—At the time of  
24          the budget submission of the Department for  
25          each fiscal year, the Secretary shall submit a

1 report to Congress that describes the status of  
2 milestones and costs in achieving the objectives  
3 of the exascale computing program.

4 “(C) EXASCALE MERIT REPORT.—At least  
5 18 months prior to the initiation of construction  
6 or installation of any exascale-class computing  
7 facility, the Secretary shall transmit a plan to  
8 the Congress detailing—

9 “(i) the proposed facility’s cost projec-  
10 tions and capabilities to significantly accel-  
11 erate the development of new energy tech-  
12 nologies;

13 “(ii) technical risks and challenges  
14 that must be overcome to achieve success-  
15 ful completion and operation of the facility;  
16 and

17 “(iii) an independent assessment of  
18 the scientific and technological advances  
19 expected from such a facility relative to  
20 those expected from a comparable invest-  
21 ment in expanded research and applica-  
22 tions at terascale-class and petascale-class  
23 computing facilities, including an evalua-  
24 tion of where investments should be made

1 in the system software and algorithms to  
2 enable these advances.”.

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