

114TH CONGRESS
1ST SESSION

H. R. 874

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.

IN THE HOUSE OF REPRESENTATIVES

FEBRUARY 11, 2015

Mr. HULTGREN (for himself, Mr. SMITH of Texas, Mr. FATTAH, Mr. KINZINGER of Illinois, Mr. SWALWELL of California, and Mr. LIPINSKI) introduced the following bill; which was referred to the Committee on Science, Space, and Technology

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 2 of the Energy
24 Policy Act of 2005 (42 U.S.C. 15801).

25 “(6) LEADERSHIP SYSTEM.—The term ‘leader-
26 ship system’ means a high-end computing system

1 that is among the most advanced in the world in
2 terms of performance in solving scientific and engi-
3 neering problems.

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

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

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

13 **SEC. 3. DEPARTMENT OF ENERGY HIGH-END COMPUTING**
14 **RESEARCH AND DEVELOPMENT PROGRAM.**

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

18 (1) in subsection (a)—

19 (A) in paragraph (1), by striking “pro-
20 gram” and inserting “coordinated program
21 across the Department”;

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

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

1 (D) by adding at the end the following new
2 paragraph:

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

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

15 (3) by striking subsection (d) and inserting the
16 following:

17 “(d) EXASCALE COMPUTING PROGRAM.—

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

22 “(2) EXECUTION.—The Secretary shall,
23 through competitive merit review, establish two or
24 more National Laboratory-industry-university part-
25 nerships to conduct integrated research, develop-

1 ment, and engineering of multiple exascale architec-
2 tures, and—

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

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

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

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

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

23 “(B) conduct outreach programs to in-
24 crease the readiness for the use of such plat-

1 forms by domestic industries, including manu-
2 facturers.

3 “(4) REPORTS.—

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

1 “(B) STATUS REPORTS.—At the time of
2 the budget submission of the Department for
3 each fiscal year, the Secretary shall submit a
4 report to Congress that describes the status of
5 milestones and costs in achieving the objectives
6 of the exascale computing program.

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

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

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

20 “(iii) an independent assessment of
21 the scientific and technological advances
22 expected from such a facility relative to
23 those expected from a comparable invest-
24 ment in expanded research and applica-
25 tions at terascale-class and petascale-class

1 computing facilities, including an evalua-
2 tion of where investments should be made
3 in the system software and algorithms to
4 enable these advances.”.

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