

114TH CONGRESS
1ST SESSION

H. R. 874

IN THE SENATE OF THE UNITED STATES

MAY 20, 2015

Received; read twice and referred to the Committee on Energy and Natural
Resources

AN ACT

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,*

1 **SECTION 1. SHORT TITLE.**

2 This Act may be cited as the “American Super Com-
3 puting Leadership Act”.

4 **SEC. 2. DEFINITIONS.**

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

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

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

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

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

24 “(5) INSTITUTION OF HIGHER EDUCATION.—
25 The term ‘institution of higher education’ has the

1 meaning given the term in section 2 of the Energy
2 Policy Act of 2005 (42 U.S.C. 15801).

3 “(6) LEADERSHIP SYSTEM.—The term ‘leader-
4 ship system’ means a high-end computing system
5 that is among the most advanced in the world in
6 terms of performance in solving scientific and engi-
7 neering problems.

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

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

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

17 **SEC. 3. DEPARTMENT OF ENERGY HIGH-END COMPUTING**
18 **RESEARCH AND DEVELOPMENT PROGRAM.**

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

22 (1) in subsection (a)—

23 (A) in paragraph (1), by striking “pro-
24 gram” and inserting “coordinated program
25 across the Department”;

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

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

5 (D) by adding at the end the following new
6 paragraph:

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

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

19 (3) by striking subsection (d) and inserting the
20 following:

21 “(d) EXASCALE COMPUTING PROGRAM.—

22 “(1) IN GENERAL.—The Secretary shall con-
23 duct a coordinated research program to develop
24 exascale computing systems to advance the missions
25 of the Department.

1 “(2) EXECUTION.—The Secretary shall,
2 through competitive merit review, establish two or
3 more National Laboratory-industry-university part-
4 nerships to conduct integrated research, develop-
5 ment, and engineering of multiple exascale architec-
6 tures, and—

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

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

16 “(C) explore the use of exascale computing
17 technologies to advance a broad range of
18 science and engineering.

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

21 “(A) provide, on a competitive, merit-re-
22 viewed basis, access for researchers in United
23 States industry, institutions of higher edu-
24 cation, National Laboratories, and other Fed-

1 eral agencies to these exascale systems, as ap-
2 propriate; and

3 “(B) conduct outreach programs to in-
4 crease the readiness for the use of such plat-
5 forms by domestic industries, including manu-
6 facturers.

7 “(4) REPORTS.—

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

1 grated program across the Department. The re-
2 port shall also include a plan for ensuring bal-
3 ance and prioritizing across ASCR subprograms
4 in a flat or slow-growth budget environment.

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

11 “(C) EXASCALE MERIT REPORT.—At least
12 18 months prior to the initiation of construction
13 or installation of any exascale-class computing
14 facility, the Secretary shall transmit a plan to
15 the Congress detailing—

16 “(i) the proposed facility’s cost projec-
17 tions and capabilities to significantly accel-
18 erate the development of new energy tech-
19 nologies;

20 “(ii) technical risks and challenges
21 that must be overcome to achieve success-
22 ful completion and operation of the facility;
23 and

24 “(iii) an independent assessment of
25 the scientific and technological advances

1 expected from such a facility relative to
2 those expected from a comparable invest-
3 ment in expanded research and applica-
4 tions at terascale-class and petascale-class
5 computing facilities, including an evalua-
6 tion of where investments should be made
7 in the system software and algorithms to
8 enable these advances.”.

Passed the House of Representatives May 19, 2015.

Attest:

KAREN L. HAAS,

Clerk.