Calendar No. 738

108TH CONGRESS
2D SESSION

H. R. 4516

[Report No. 108–379]

IN THE SENATE OF THE UNITED STATES

JULY 8, 2004

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

SEPTEMBER 28, 2004

Reported by Mr. DOMENICI, with an amendment

[Strike out all after the enacting clause and insert the part printed in italic]

AN ACT

To require the Secretary of Energy to carry out a program of research and development to advance high-end computing.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

~~**SECTION 1. SHORT TITLE.**~~

~~This Act may be cited as the "Department of Energy High-End Computing Revitalization Act of 2004".~~

SEC. 2. DEFINITIONS.

For purposes of this Act:

(1) HIGH-END COMPUTING SYSTEM.—The term ''high-end computing system'' means a computing system with performance that substantially exceeds that of systems that are commonly available for advanced scientific and engineering applications.

(2) LEADERSHIP SYSTEM.—The term ''Leadership System'' means a high-end computing system that is among the most advanced in the world in terms of performance in solving scientific and engineering problems.

(3) INSTITUTION OF HIGHER EDUCATION.—The term ''institution of higher education'' has the meaning given the term in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a)).

(4) SECRETARY.—The term ''Secretary'' means the Secretary of Energy.

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

(a) IN GENERAL.—The Secretary shall carry out a program of research and development (involving software and hardware) to advance high-end computing systems, and shall develop and deploy such systems for advanced scientific and engineering applications.

(b) PROGRAM.—The program shall—

~~(1) support both individual investigators and multidisciplinary teams of investigators;~~

~~(2) conduct research in multiple architectures, which may include vector, reconfigurable logic, streaming, processor-in-memory, and multithreading architectures;~~

~~(3) conduct research on software for high-end computing systems, including research on algorithms, programming environments, tools, languages, and operating systems for high-end computing systems, in collaboration with architecture development efforts;~~

~~(4) provide for sustained access by the research community in the United States to high-end computing systems and to Leadership Systems, including provision for technical support for users of such systems;~~

~~(5) support technology transfer to the private sector and others in accordance with applicable law; and~~

~~(6) ensure that the high-end computing activities of the Department of Energy are coordinated with relevant activities in industry and with other Federal agencies, including the National Science Foundation, the Defense Advanced Research~~

Projects Agency, the National Security Agency, the National Institutes of Health, the National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration, the National Institute of Standards and Technology, and the Environmental Protection Agency.

(c) LEADERSHIP SYSTEMS FACILITIES.—

(1) IN GENERAL.—As part of the program carried out under this Act, the Secretary shall establish and operate Leadership Systems facilities to—

(A) conduct advanced scientific and engineering research and development using Leadership Systems; and

(B) develop potential advancements in high-end computing system hardware and software.

(2) ADMINISTRATION.—In carrying out this subsection, the Secretary shall provide access to Leadership Systems on a competitive, merit-reviewed basis to researchers in United States industry, institutions of higher education, national laboratories, and other Federal agencies.

SEC. 4. AUTHORIZATION OF APPROPRIATIONS.

In addition to amounts otherwise made available for high-end computing, there are authorized to be appropriated to the Secretary to carry out this Act—

(1) $50,000,000 for fiscal year 2005;

(2) $55,000,000 for fiscal year 2006; and

(3) $60,000,000 for fiscal year 2007.

SEC. 5. SOCIETAL IMPLICATIONS OF INFORMATION TECHNOLOGY.

In carrying out its programs on the social, economic, legal, ethical, and cultural implications of information technology, the National Science Foundation shall support research into the implications of computers (including both hardware and software) that would be capable of mimicking human abilities to learn, reason, and make decisions.

SEC. 6. ASTRONOMY AND ASTROPHYSICS ADVISORY COMMITTEE.

(a) AMENDMENTS.—Section 23 of the National Science Foundation Authorization Act of 2002 (42 U.S.C. 1862n–9) is amended—

(1) by striking "and the National Aeronautics and Space Administration" each place it appears in subsections (a) and (b) and inserting ", the National Aeronautics and Space Administration, and the Department of Energy";

(2) in subsection (b)(3), by inserting ''the Secretary of Energy,'' after ''the Administrator of the National Aeronauties and Space Administration,'';

(3) in subsection (c)—

(A) by striking ''5'' in each of paragraphs (1) and (2) and inserting ''4'';

(B) by striking ''and'' at the end of paragraph (2);

(C) by redesignating paragraph (3) as paragraph (4), and in that paragraph by striking ''3'' and inserting ''2''; and

(D) by inserting after paragraph (2) the following new paragraph:

''(3) 3 members selected by the Secretary of Energy; and''; and

(4) in subsection (f), by striking ''the advisory bodies of other Federal agencies, such as the Department of Energy, which may engage in related research activities'' and inserting ''other Federal advisory committees that advise Federal agencies which engage in related research activities''.

(b) EFFECTIVE DATE.—The amendments made by subsection (a) shall take effect on March 15, 2005.

~~**SEC. 7. REMOVAL OF SUNSET PROVISION FROM SAVINGS IN CONSTRUCTION ACT OF 1996.**~~

~~Section 14(e) of the Metric Conversion Act of 1975 (15 U.S.C. 205l(e)) is repealed.~~

SECTION 1. SHORT TITLE.

This Act may be cited as the "Department of Energy High-End Computing Revitalization Act of 2004".

SEC. 2. DEFINITIONS.

In this Act:

(1) CENTER.—The term "Center" means a High-End Software Development Center established under section 3(d).

(2) HIGH-END COMPUTING SYSTEM.—The term "high-end computing system" means a computing system with performance that substantially exceeds that of systems that are commonly available for advanced scientific and engineering applications.

(3) INSTITUTION OF HIGHER EDUCATION.—The term "institution of higher education" has the meaning given the term in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a)).

(4) LEADERSHIP SYSTEM.—The term "Leadership System" means a high-end computing system that is among the most advanced in the world in terms of performance in solving scientific and engineering problems.

(5) SECRETARY.—The term "Secretary" means the Secretary of Energy, acting through the Director of the Office of Science of the Department of Energy.

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

(a) IN GENERAL.—The Secretary shall—

(1) carry out a program of research and development (including development of software and hardware) to advance high-end computing systems; and

(2) develop and deploy high-end computing systems for advanced scientific and engineering applications.

(b) PROGRAM.—The program shall—

(1) support both individual investigators and multidisciplinary teams of investigators;

(2) conduct research in multiple architectures, which may include vector, reconfigurable logic, streaming, processor-in-memory, and multithreading architectures;

(3) conduct research on software for high-end computing systems, including research on algorithms, programming environments, tools, languages, and operating systems for high-end computing systems, in collaboration with architecture development efforts;

(4) provide for sustained access by the research community in the United States to high-end computing systems and to Leadership Systems, including provision of technical support for users of such systems;

(5) support technology transfer to the private sector and others in accordance with applicable law; and

(6) ensure that the high-end computing activities of the Department of Energy are coordinated with relevant activities in industry and with other Federal agencies, including the National Science Foundation, the Defense Advanced Research Projects Agency, the National Nuclear Security Administration, the National Security Agency, the National Institutes of Health, the National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration, the National Institutes of Standards and Technology, and the Environmental Protection Agency.

(c) LEADERSHIP SYSTEMS FACILITIES.—

(1) IN GENERAL.—As part of the program carried out under this Act, the Secretary shall establish and operate 1 or more Leadership Systems facilities to—

(A) conduct advanced scientific and engineering research and development using Leadership Systems; and

(B) develop potential advancements in high-end computing system hardware and software.

(2) ADMINISTRATION.—In carrying out this subsection, the Secretary shall provide to Leadership Systems, on a competitive, merit-reviewed basis, access to researchers in United States industry, institutions of higher education, national laboratories, and other Federal agencies.

(d) HIGH-END SOFTWARE DEVELOPMENT CENTER.—

(1) IN GENERAL.—As part of the program carried out under this Act, the Secretary shall establish at least 1 High-End Software Development Center.

(2) DUTIES.—A Center shall concentrate efforts to develop, test, maintain, and support optimal algorithms, programming environments, tools, languages, and operating systems for high-end computing systems.

(3) STAFF.—A Center shall include—

(A) a full-time research staff, to create a centralized knowledge base for high-end software development; and

(B) a rotating staff of researchers from other institutions and industry to assist in coordination of research efforts and promote technology transfer to the private sector.

(4) USE OF EXPERTISE.—The Secretary shall use the expertise of a Center to assess research and development in high-end computing system architecture.

(5) LOCATION.—The location of a Center shall be determined by a competitive proposal process administered by the Secretary.

SEC. 4. AUTHORIZATION OF APPROPRIATIONS.

In addition to amounts otherwise made available for high-end computing, there are authorized to be appropriated to the Secretary to carry out this Act—

(1) $50,000,000 for fiscal year 2005;

(2) $55,000,000 for fiscal year 2006; and

(3) $60,000,000 for fiscal year 2007.

SEC. 5. ASTRONOMY AND ASTROPHYSICS ADVISORY COMMITTEE.

(a) AMENDMENTS.—Section 23 of the National Science Foundation Authorization Act of 2002 (42 U.S.C. 1862n–9) is amended—

(1) in subsection (a) and paragraphs (1) and (2) of subsection (b), by striking "and the National Aeronautics and Space Administration" and inserting ",

the National Aeronautics and Space Administration, and the Department of Energy";

(2) in subsection (b)(3), by stiking "Administration, and" and inserting "Administration, the Secretary of Energy,";

(3) in subsection (c)—

(A) in paragraphs (1) and (2), by striking "5" and inserting "4";

(B) in paragraph (2), by striking "and" at the end;

(C) by redesignating paragraph (3) as paragraph (4), and in that paragraph by striking "3" and inserting "2"; and

(D) by inserting after paragraph (2) the following:

"(3) 3 members selected by the Secretary of Energy; and"; and

(4) in subsection (f), by striking "the advisory bodies of other Federal agencies, such as the Department of Energy, which may engage in related research activities" and inserting "other Federal advisory committees that advise Federal agencies that engage in related research activities".

(b) EFFECTIVE DATE.—The amendments made by subsection (a) take effect on March 15, 2005.

SEC. 6. REMOVAL OF SUNSET PROVISION FROM SAVINGS IN CONSTRUCTION ACT OF 1996.

Section 14 of the Metric Conversion Act of 1975 (15 U.S.C. 205l) is amended by striking subsection (e).

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