

(1) include field demonstrations of sufficient scale and number so as to demonstrate technical and economic feasibility;

(2) incorporate materials that increase engine efficiency; and

(3) cover advanced engine designs for electric and industrial power generation for a range of small-, mid-, and large-scale applications, including—

(A) mechanically recuperated gas turbines;

(B) intercooled gas turbines with steam injection or recuperation;

(C) gas turbines utilizing reformed fuels or hydrogen; and

(D) high efficiency, simple cycle gas turbines.

**(b) Program goal**

The goal of the program established under subsection (a) of this section shall be to develop heat engines that can achieve over 50 percent efficiency in the mid-term.

**(c) Program plan**

Within 180 days after October 24, 1992, the Secretary shall prepare and submit to the Congress a 5-year program plan, to be included in the plan required under section 13451(c) of this title, to guide the activities under this section. In preparing the program plan, the Secretary shall consult with appropriate representatives of industry, institutions of higher education, Federal agencies, including the Environmental Protection Agency and national laboratories, and professional and technical societies.

**(d) Proposals**

Within 1 year after October 24, 1992, the Secretary shall solicit proposals for conducting activities under this section.

**(e) Authorization of appropriations**

There are authorized to be appropriated to the Secretary for carrying out this section such sums as may be necessary to be derived from sums authorized under section 13451(e) of this title.

(Pub. L. 102-486, title XXI, § 2112, Oct. 24, 1992, 106 Stat. 3072.)

**§ 13473. Civilian nuclear waste**

**(a) Study**

The Secretary shall conduct a study of the potential for minimizing the volume and toxic lifetime of nuclear waste, including an analysis of the viability of existing technologies and an assessment of the extent of research and development required for new technologies.

**(b) Program**

Based on the results of the study required under subsection (a) of this section, the Secretary shall prepare and submit to Congress a 5-year program plan for carrying out a program of research and development on new technologies for minimizing the volume and toxic lifetime of, and thereby mitigating hazards associated with, nuclear waste.

**(c) Authorization of appropriations**

There are authorized to be appropriated to the Secretary for carrying out this section \$4,700,000

for fiscal year 1993 and such sums as may be necessary for fiscal year 1994.

(Pub. L. 102-486, title XXI, § 2113, Oct. 24, 1992, 106 Stat. 3073.)

**§ 13474. Fusion energy**

**(a) Program**

The Secretary shall conduct a fusion energy 5-year program, in accordance with sections 13541 and 13542 of this title, that by the year 2010 will result in a technology demonstration which verifies the practicability of commercial electric power production.

**(b) Program goals**

The goals of the program established under subsection (a) of this section shall include—

(1) a broad based fusion energy program;

(2) United States participation in the Engineering Design Activity of the International Thermonuclear Experimental Reactor (ITER) program and in the related research and technology development efforts;

(3) the development of technology for fusion power and industrial participation in the development of such technology;

(4) the design and construction of a major new machine for fusion research and technology development consistent with paragraphs (2) and (3); and

(5) research and development for Inertial Confinement Fusion Energy and development of a Heavy Ion Inertial Confinement Fusion experiment.

**(c) Management plan**

(1) Within 180 days after October 24, 1992, the Secretary shall prepare a comprehensive management plan for the fusion energy program. The plan shall include specific program objectives, milestones and schedules for technology development, and cost estimates and program management resource requirements.

(2) The plan shall also include a description of—

(A) United States participation in the Engineering Design Activity of ITER, including industrial participation;

(B) potential United States participation in the construction and operation of an ITER facility; and

(C) the requirements needed to build and test an inertial fusion energy reactor for the purpose of power production.

(3) As part of the plan required under paragraph (1), the Secretary shall evaluate the status of international fusion programs and evaluate whether the Federal Government should initiate efforts to strengthen existing international cooperative agreements in fusion energy or enter into new cooperative agreements to accomplish the purposes of this section.

(4) The plan shall also evaluate the extent to which university or private sector participation is appropriate or necessary in order to carry out the purposes of this section.

(5) The President shall include in the budget submitted to the Congress each year under section 1105 of title 31 a report prepared by the Sec-

retary describing the progress made in meeting the program objectives, milestones, and schedules established in the management plan. Each such report shall also describe the organization of the program, the personnel assigned and funds committed to the program, and expenditures made in carrying out the program objectives. The report shall be submitted with the plan required under section 13523 of this title.

**(d) Authorization of appropriations**

There are authorized to be appropriated to the Secretary for carrying out this section \$339,710,000 for fiscal year 1993 and \$380,000,000 for fiscal year 1994.

(Pub. L. 102-486, title XXI, § 2114, Oct. 24, 1992, 106 Stat. 3073; Pub. L. 104-66, title I, § 1052(i), Dec. 21, 1995, 109 Stat. 719.)

AMENDMENTS

1995—Subsec. (c)(5). Pub. L. 104-66 inserted first sentence and struck out former first sentence which read as follows: “Within 1 year after October 24, 1992, and every 2 years thereafter, the Secretary shall issue a report describing the progress made in meeting the program objectives, milestones, and schedules established in the management plan.”

**§ 13475. Fuel cells**

**(a) Program direction**

The Secretary shall conduct a 5-year program, in accordance with sections 13541 and 13542 of this title, on efficient and environmentally benign power generation using fuel cells. The program may include activities on molten carbonate, solid oxide, including tubular, monolithic, and planar technologies, and advanced concepts.

**(b) Program goal**

The goal of the program established under subsection (a) of this section is the development of cost-effective, efficient, and environmentally benign fuel cell systems which will operate on fossil fuels in multiple end use sectors.

**(c) Authorization of appropriations**

There are authorized to be appropriated to the Secretary for carrying out this section \$51,555,000 for fiscal year 1993 and \$56,000,000 for fiscal year 1994.

(Pub. L. 102-486, title XXI, § 2115, Oct. 24, 1992, 106 Stat. 3074.)

**§ 13476. Environmental restoration and waste management program**

**(a) Authorization of appropriations**

There are authorized to be appropriated to the Secretary for fiscal year 1993 \$70,000,000 for the Fast Flux Test Facility to maintain the operational status of the reactor, such sums to be derived from amounts appropriated to the Secretary for the environmental restoration and waste management program.

**(b) Long-term missions**

The Secretary shall aggressively pursue the development and implementation of long-term missions for the Fast Flux Test Facility. Within 6 months after October 24, 1992, the Secretary shall submit to the Congress a report on the progress made in carrying out this subsection.

(Pub. L. 102-486, title XXI, § 2116, Oct. 24, 1992, 106 Stat. 3075.)

**§ 13477. High-temperature superconductivity program**

**(a) Program**

The Secretary shall carry out a 5-year program, in accordance with sections 13541 and 13542 of this title, on high-temperature superconducting electric power equipment technologies. Elements of the program shall include, but are not limited to—

(1) activities that address the development of high-temperature superconducting materials that have increased electrical current capacity, which shall be the emphasis of the program for the near-term;

(2) the development of prototypes, where appropriate, of the major elements of a superconducting electric power system such as motors, generators, transmission lines, transformers, and magnetic energy storage systems;

(3) activities that will improve the efficiency of materials performance of higher temperatures and at all magnetic field orientations;

(4) development of prototypes based on high-temperature superconducting wire, that operate at the highest temperature possible, and refrigeration systems using cryogenics such as nitrogen;

(5) activities that will assist the private sector with designs for more efficient electric power generation and delivery systems which are cost competitive with conventional energy systems; and

(6) development of prototypes that have application in both the commercial and defense sectors.

The Secretary is also encouraged to expedite government, laboratory, industry, and university collaborative agreements under existing mechanisms at the Department of Energy in coordination with other Federal agencies.

**(b) Authorization of appropriations**

There are authorized to be appropriated to the Secretary for carrying out this section \$21,900,000 for fiscal year 1993 and such sums as may be necessary for subsequent fiscal years, to be derived from sums authorized under section 13471(c) of this title.

(Pub. L. 102-486, title XXI, § 2117, Oct. 24, 1992, 106 Stat. 3075.)

**§ 13478. Electric and magnetic fields research and public information dissemination program**

**(a) Program**

The Secretary shall, in accordance with this section (including the agenda developed under subsection (d)(1)(A) of this section) and within 2 months after October 24, 1992, establish a comprehensive program to—

(1) determine whether or not exposure to electric and magnetic fields produced by the generation, transmission, and use of electric energy affects human health;

(2) carry out research, development, and demonstration with respect to technologies to