

**§ 16154. Clean hydrogen research and development program**

**(a) In general**

The Secretary, in consultation with other Federal agencies and the private sector, shall conduct a crosscutting research and development program (referred to in this section as the “program”) on technologies relating to the production, processing, purification, distribution, storage, and use of hydrogen energy, fuel cells, and related infrastructure.

**(b) Goals**

The goals of the program shall be—

(1) to advance research and development to demonstrate and commercialize the use of clean hydrogen in the transportation, utility, industrial, commercial, and residential sectors; and

(2) to demonstrate a standard of clean hydrogen production in the transportation, utility, industrial, commercial, and residential sectors by 2040.

**(c) Focus**

In carrying out activities under this section, the Secretary shall focus on factors that are common to the development of hydrogen infrastructure and the supply of vehicle and electric power for critical consumer and commercial applications, and that achieve continuous technical evolution and cost reduction, particularly for hydrogen production, the supply of hydrogen, storage of hydrogen, and end uses of hydrogen that—

(1) steadily increase production, distribution, and end use efficiency and reduce life-cycle emissions;

(2) resolve critical problems relating to catalysts, membranes, storage, lightweight materials, electronic controls, manufacturability, and other problems that emerge from the program;

(3) enhance sources of fossil fuels with carbon capture, utilization, and sequestration, renewable fuels, biofuels, and nuclear energy for hydrogen production; and

(4) enable widespread use of distributed electricity generation and storage.

**(d) Public education and research**

In carrying out this section, the Secretary shall support enhanced public education and research conducted at institutions of higher education in fundamental sciences, application design, and systems concepts (including education and research relating to materials, subsystems, manufacturability, maintenance, and safety) relating to hydrogen and fuel cells.

**(e) Activities**

In carrying out the program, the Secretary, in partnership with the private sector, shall conduct activities to advance and support—

(1) the establishment of a series of technology cost goals oriented toward achieving the standard of clean hydrogen production developed under section 16166(a) of this title;

(2) the production of clean hydrogen from diverse energy sources, including—

(A) fossil fuels with carbon capture, utilization, and sequestration;

(B) hydrogen-carrier fuels (including ethanol and methanol);

(C) renewable energy resources, including biomass;

(D) nuclear energy; and

(E) any other methods the Secretary determines to be appropriate;

(3) the use of clean hydrogen for commercial, industrial, and residential electric power generation;

(4) the use of clean hydrogen in industrial applications, including steelmaking, cement, chemical feedstocks, and process heat;

(5) the use of clean hydrogen for use as a fuel source for both residential and commercial comfort heating and hot water requirements;

(6) the safe and efficient delivery of hydrogen or hydrogen-carrier fuels, including—

(A) transmission by pipelines, including retrofitting the existing natural gas transportation infrastructure system to enable a transition to transport and deliver increasing levels of clean hydrogen, clean hydrogen blends, or clean hydrogen carriers;

(B) tanks and other distribution methods; and

(C) convenient and economic refueling of vehicles, locomotives, maritime vessels, or planes—

(i) at central refueling stations; or

(ii) through distributed onsite generation;

(7) advanced vehicle, locomotive, maritime vessel, or plane technologies, including—

(A) engine and emission control systems;

(B) energy storage, electric propulsion, and hybrid systems;

(C) automotive, locomotive, maritime vessel, or plane materials; and

(D) other advanced vehicle, locomotive, maritime vessel, or plane technologies;

(8) storage of hydrogen or hydrogen-carrier fuels, including the development of materials for safe and economic storage in gaseous, liquid, or solid form;

(9) the development of safe, durable, affordable, and efficient fuel cells, including fuel-flexible fuel cell power systems, improved manufacturing processes, high-temperature membranes, cost-effective fuel processing for natural gas, fuel cell stack and system reliability, low-temperature operation, and cold start capability;

(10) the ability of domestic clean hydrogen equipment manufacturers to manufacture commercially available competitive technologies in the United States;

(11) the use of clean hydrogen in the transportation sector, including in light-, medium-, and heavy-duty vehicles, rail transport, aviation, and maritime applications; and

(12) in coordination with relevant agencies, the development of appropriate, uniform codes and standards for the safe and consistent deployment and commercialization of clean hydrogen production, processing, delivery, and end-use technologies.

**(f) Program goals**

**(1) Vehicles**

For vehicles, the goals of the program are—

(A) to enable a commitment by automakers no later than year 2015 to offer safe, affordable, and technically viable hydrogen fuel cell vehicles in the mass consumer market; and

(B) to enable production, delivery, and acceptance by consumers of model year 2020 hydrogen fuel cell and other hydrogen-powered vehicles that will have, when compared to light duty vehicles in model year 2005—

- (i) fuel economy that is substantially higher;
- (ii) substantially lower emissions of air pollutants; and
- (iii) equivalent or improved vehicle fuel system crash integrity and occupant protection.

### (2) Hydrogen energy and energy infrastructure

For hydrogen energy and energy infrastructure, the goals of the program are to enable a commitment not later than 2015 that will lead to infrastructure by 2020 that will provide—

- (A) safe and convenient refueling;
- (B) improved overall efficiency;
- (C) widespread availability of hydrogen from domestic energy sources through—
  - (i) production, with consideration of emissions levels;
  - (ii) delivery, including transmission by pipeline and other distribution methods for hydrogen; and
  - (iii) storage, including storage in surface transportation vehicles;
- (D) hydrogen for fuel cells, internal combustion engines, and other energy conversion devices for portable, stationary, micro, critical needs facilities, and transportation applications; and
- (E) other technologies consistent with the Department's plan.

### (3) Fuel cells

The goals for fuel cells and their portable, stationary, and transportation applications are to enable—

- (A) safe, economical, and environmentally sound hydrogen fuel cells;
- (B) fuel cells for light duty and other vehicles; and
- (C) other technologies consistent with the Department's plan.

### (g) Funding

#### (1) In general

The Secretary shall carry out the programs under this section using a competitive, merit-based review process and consistent with the generally applicable Federal laws and regulations governing awards of financial assistance, contracts, or other agreements.

#### (2) Research centers

Activities under this section may be carried out by funding nationally recognized university-based or Federal laboratory research centers.

### (h) Hydrogen supply

There are authorized to be appropriated to carry out projects and activities relating to hydrogen production, storage, distribution and dis-

persing, transport, education and coordination, and technology transfer under this section—

- (1) \$160,000,000 for fiscal year 2006;
- (2) \$200,000,000 for fiscal year 2007;
- (3) \$220,000,000 for fiscal year 2008;
- (4) \$230,000,000 for fiscal year 2009;
- (5) \$250,000,000 for fiscal year 2010; and
- (6) such sums as are necessary for each of fiscal years 2011 through 2020.

#### (i) Fuel cell technologies

There are authorized to be appropriated to carry out projects and activities relating to fuel cell technologies under this section—

- (1) \$150,000,000 for fiscal year 2006;
- (2) \$160,000,000 for fiscal year 2007;
- (3) \$170,000,000 for fiscal year 2008;
- (4) \$180,000,000 for fiscal year 2009;
- (5) \$200,000,000 for fiscal year 2010; and
- (6) such sums as are necessary for each of fiscal years 2011 through 2020.

#### (j) Targets

Not later than 180 days after November 15, 2021, the Secretary shall establish targets for the program to address near-term (up to 2 years), mid-term (up to 7 years), and long-term (up to 15 years) challenges to the advancement of clean hydrogen systems and technologies.

(Pub. L. 109-58, title VIII, § 805, Aug. 8, 2005, 119 Stat. 845; Pub. L. 117-58, div. D, title III, § 40313(a), Nov. 15, 2021, 135 Stat. 1006.)

### Editorial Notes

#### AMENDMENTS

2021—Pub. L. 117-58, § 40313(a)(1), substituted “Clean hydrogen research and development program” for “Programs” in section catchline.

Subsec. (a). Pub. L. 117-58, § 40313(a)(2), substituted “crosscutting research and development program (referred to in this section as the ‘program’)” for “research and development program” and inserted “processing,” after “production.”

Subsec. (b). Pub. L. 117-58, § 40313(a)(3), added subsec. (b) and struck out former subsec. (b). Prior to amendment, text read as follows: “The goal of the program shall be to demonstrate and commercialize the use of hydrogen for transportation (in light-duty vehicles and heavy-duty vehicles), utility, industrial, commercial, and residential applications.”

Subsec. (c)(3). Pub. L. 117-58, § 40313(a)(4), substituted “fossil fuels with carbon capture, utilization, and sequestration, renewable fuels, biofuels, and nuclear energy” for “renewable fuels and biofuels”.

Subsec. (e). Pub. L. 117-58, § 40313(a)(5), added subsec. (e) and struck out former subsec. (e) which required Secretary, in partnership with private sector, to conduct programs to address certain activities.

Subsec. (j). Pub. L. 117-58, § 40313(a)(6), added subsec. (j).

### Statutory Notes and Related Subsidiaries

#### WAGE RATE REQUIREMENTS

For provisions relating to rates of wages to be paid to laborers and mechanics on projects for construction, alteration, or repair work funded under div. D or an amendment by div. D of Pub. L. 117-58, including authority of Secretary of Labor, see section 18851 of this title.

### § 16155. Hydrogen and Fuel Cell Technical Task Force

#### (a) Establishment

Not later than 120 days after August 8, 2005, the President shall establish an interagency