

Calendar No. 360

116TH CONGRESS }
2d Session }

SENATE

{ REPORT
{ 116-199

INTEGRATED ENERGY SYSTEMS ACT

JANUARY 7, 2020.—Ordered to be printed

Ms. MURKOWSKI, from the Committee on Energy and Natural Resources, submitted the following

R E P O R T

[To accompany S. 2702]

The Committee on Energy and Natural Resources, to which was referred the bill (S. 2702) to require the Secretary of Energy to establish an integrated energy systems research, development, and demonstration program, and for other purposes, having considered the same, reports favorably thereon with an amendment in the nature of a substitute and recommends that the bill, as amended, do pass.

AMENDMENT

The amendment is as follows:

Strike all after the enacting clause and insert the following:

SECTION 1. SHORT TITLE.

This Act may be cited as the “Integrated Energy Systems Act of 2019”.

SEC. 2. INTEGRATED ENERGY SYSTEMS PROGRAM.

(a) DEFINITIONS.—In this section:

(1) PROGRAM.—The term “program” means the Integrated Energy Systems Program established under subsection (b)(1).

(2) SECRETARY.—The term “Secretary” means the Secretary of Energy.

(b) ESTABLISHMENT.—

(1) IN GENERAL.—The Secretary shall establish a program, to be known as the “Integrated Energy Systems Program”—

(A) to maximize energy production and efficiency;

(B) to develop energy systems involving the integration of nuclear energy with renewable energy, fossil energy, and energy storage; and

(C) to expand the use of emissions-reducing energy technologies into non-electric sectors to achieve significant reductions in environmental emissions.

(2) PROGRAM ADMINISTRATION; PARTNERS.—The program shall be carried out by the Undersecretary of Energy, in partnership with—

(A) relevant offices within the Department of Energy;

(B) National Laboratories;

- (C) institutions of higher education; and
- (D) the private sector.
- (3) GOALS AND MILESTONES.—The Secretary shall establish quantitative goals and milestones for the program.
- (c) RESEARCH AREAS.—Research areas under the program may include—
 - (1) technology innovation to further the expansion of emissions-reducing energy technologies to accommodate a modern, resilient grid system by—
 - (A) effectively leveraging multiple energy sources;
 - (B) enhancing and streamlining engineering design;
 - (C) carrying out process demonstrations to optimize performance; and
 - (D) streamlining regulatory review;
 - (2) advanced power cycles, energy extraction, and processing of complex hydrocarbons to produce high-value chemicals;
 - (3) efficient use of emissions-reducing energy technologies for hydrogen production to support transportation and industrial needs;
 - (4) enhancement and acceleration of domestic manufacturing and desalinization technologies and processes by optimally using clean energy sources;
 - (5) more effective thermal energy use, transport, and storage;
 - (6) the demonstration of nuclear energy delivery for—
 - (A) the production of chemicals, metals, and fuels;
 - (B) the capture, use, and storage of carbon;
 - (C) renewable integration with an integrated energy system; and
 - (D) conversion of carbon feedstock, such as coal, biomass, natural gas, and refuse waste, to higher value nonelectric commodities;
 - (7) the development of new analysis capabilities to identify the best ways—
 - (A) to leverage multiple energy sources in a given region; and
 - (B) to quantify the benefits of integrated energy systems; and
 - (8) any other area that, as determined by the Secretary, meets the purpose and goals of the program.
- (d) GRANTS.—The Secretary may award grants under the program to support the goals of the program.

SEC. 3. REPORT ON DUPLICATIVE PROGRAMS.

Not later than 1 year after the date of enactment of this Act, and annually thereafter, the Secretary shall submit to Congress a report identifying any program that is duplicative of the program established under section 2(b)(1).

PURPOSE

The purpose of S. 2702 is to require the Secretary of Energy (Secretary) to establish an integrated energy systems research, development, and demonstration program (Program).

BACKGROUND AND NEED

Nuclear energy provides 19 percent of the electricity in the United States, and over half of the zero-emission electricity in the country. This electricity is provided by 96 nuclear reactors, all of which were licensed to start construction over 40 years ago, and in many cases over 50 years ago. All were designed to produce baseload electricity. The electricity system has changed dramatically since their construction, with electricity prices now significantly lower and with an increasingly higher value placed on operational flexibility.

Nine reactors have shut down since 2013, primarily because of economic competition from natural gas and renewable energy sources and maintenance challenges. There are now 96 commercial reactors operating in the U.S. with only two new units currently under construction and an additional eight units scheduled to be closed by 2025. The need to modernize the nuclear energy industry has led to a focus on nonelectric applications of nuclear energy, as well as ways to better integrate nuclear technologies with variable energy sources such as renewable energy.

The Department of Energy (DOE) conducts a wide variety of research and development (R&D) into nuclear technologies through the Office of Nuclear Energy, including advanced reactors, fuel cycle development, and Nuclear Energy Enabling Technologies (NEET). Within NEET, DOE has supported a program on hybrid energy systems R&D in coordination with the Office of Energy Efficiency and Renewable Energy (EERE). That program focuses on the integration of nuclear energy with renewables, fossil energy, and energy storage, as well as industrial energy options.

Two of the program's major focuses to date have been the Joint Use Modular Plant (JUMP) program, and the investigation of producing hydrogen from nuclear energy. The JUMP program is a plant to utilize one module at the NuScale small modular reactor facility for research into integrated energy systems and nonelectric applications of nuclear energy. The NuScale plant is expected to begin operations in 2026. The other hydrogen initiative has been focused on demonstrating production utilizing existing commercial nuclear power plants. So far this year there have been awards made from both the Offices of Nuclear Energy and EERE to support R&D at four nuclear plants.

The Integrated Energy Systems Act would establish a dedicated Program within the DOE to accelerate the development of new integrated energy systems among the applied energy offices.

LEGISLATIVE HISTORY

S. 2702 was introduced by Senators Risch and Manchin on October 24, 2019. The Subcommittee on Energy held a hearing on S. 2702 on November 6, 2019.

The Senate Committee on Energy and Natural Resources met in open business session on November 19, 2019, and ordered S. 2702 favorably reported, as amended.

COMMITTEE RECOMMENDATION

The Senate Committee on Energy and Natural Resources, in open business session on November 19, 2019, by a majority voice vote of a quorum present, recommends that the Senate pass S. 2702, if amended as described herein. Senator Lee asked to be recorded as voting no.

COMMITTEE AMENDMENTS

During its consideration of S. 2702, the Committee adopted a substitute amendment as amended by an amendment offered by Senator Lee. The substitute amendment removes the Program from the Office of Nuclear Energy in section 2. The substitute amendment further modifies the Program's purposes in section 2(b) to delete paragraphs (1)(B) and (1)(D) and add a new paragraph (1)(B) to include "to develop energy systems involving the integration of nuclear energy with renewable energy, fossil energy, and energy storage" as a purpose.

The substitute amendment removes the enumerated list of DOE offices from section 2(b)(2) and changes the Program's leadership from the Office of Nuclear Energy to the Undersecretary of Energy. It also deletes the specified Program goals in section 2(b)(3) and re-

places them with a general directive to the Secretary to “establish quantitative goals and milestones” for the Program.

The substitute amendment renames the research goals in section 2(c) as research areas, and modifies those research areas. The substitute amendment further deletes section 2(e) which authorized appropriations and makes a number of technical and clarifying changes to the bill.

The amendment offered by Senator Lee to the substitute amendment adds a new section 3 to require an annual report identifying programs at DOE that are duplicative of the Program.

SECTION-BY-SECTION ANALYSIS

Section 1. Short title

Section 1 sets forth the bill’s short title.

Section 2. Integrated Energy Systems Program

Section 2(a) sets forth relevant definitions.

Subsection (b) establishes an integrated energy systems program at DOE in order to meet several stated objectives. The subsection directs that the Program be carried out by the Undersecretary of Energy in partnership with other relevant DOE offices, national laboratories, institutions of higher education, and the private sector. The subsection further directs the Secretary to establish goals and milestones for the Program.

Subsection (c) sets forth the Program’s authorized research areas, including technology innovation to further the expansion of emissions-reducing energy technologies to accommodate a modern, resilient grid system, and more effective thermal energy use, transport, and storage.

Subsection (d) authorizes the Secretary to make grants to support the Program’s goals.

Section 3. Report on duplicative programs

Section 3 directs the Secretary to submit an annual report to Congress identifying any program that is duplicative of the Program established in section 2(b)(1).

COST AND BUDGETARY CONSIDERATIONS

The Congressional Budget Office estimate of the costs of this measure has been requested but was not received at the time the report was filed. When the Congressional Budget Office completes its cost estimate, it will be posted on the internet at www.cbo.gov.

REGULATORY IMPACT EVALUATION

In compliance with paragraph 11(b) of rule XXVI of the Standing Rules of the Senate, the Committee makes the following evaluation of the regulatory impact which would be incurred in carrying out S. 2702. The bill is not a regulatory measure in the sense of imposing Government-established standards or significant economic responsibilities on private individuals and businesses.

No personal information would be collected in administering the program. Therefore, there would be no impact on personal privacy.

Little, if any, additional paperwork would result from the enactment of S. 2702, as ordered reported.

CONGRESSIONALLY DIRECTED SPENDING

S. 2702, as ordered reported, does not contain any congressionally directed spending items, limited tax benefits, or limited tariff benefits as defined in rule XLIV of the Standing Rules of the Senate.

EXECUTIVE COMMUNICATIONS

The testimony provided by the Department of Energy at the November 6, 2019, hearing on S. 2702 follows:

TESTIMONY OF ASSISTANT SECRETARY DANIEL SIMMONS,
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE EN-
ERGY, U.S. DEPARTMENT OF ENERGY

INTRODUCTION

Chairman Cassidy, Ranking Member Heinrich, and Members of the Energy Subcommittee of the Committee on Energy and Natural Resources, thank you for the opportunity to testify today on legislation pertinent to the Department of Energy now pending in the Senate. My name is Daniel Simmons, and I am the Assistant Secretary for the Office of Energy Efficiency and Renewable Energy (EERE).

As the Assistant Secretary, I am responsible for overseeing a broad portfolio of energy efficiency and renewable energy programs. The technologies in my portfolio advance America's economic growth and energy security while enhancing the reliability and resilience of the U.S. energy system. The Department of Energy supports improving the energy efficiency and reducing energy costs, while at the same time ensuring important performance standards are met or exceeded. For instance, we want to ensure schools and other buildings are sufficiently bright to ensure safety, and that water flow from faucets is strong enough to clean dirty hands. Today, I would like to share what relevant work my office has done and is doing in the areas that these bills address.

I have been asked to testify on eleven (11) bills today, addressing a range of important energy issues. The Administration continues to review all of these bills. I appreciate the ongoing bipartisan efforts to address our Nation's energy challenges and I look forward to working with the Committee.

BILLS

S. 2702—Integrated Energy Systems Act

S. 2702, the Integrated Energy Systems Act, requires the Secretary of Energy to establish an integrated energy systems research, development, and demonstration program between multiple Department offices, to be known as the Integrated Energy Systems Program. The intent of the program is to maximize energy production and efficiency; provide reliable, competitive, and environmentally sustainable electricity to the grid; expand the use of emissions-re-

ducing technologies into nonelectric sectors to achieve dramatic reductions in environmental emissions; and enable the energy infrastructure of the United States to support the quantity, variability in type, and variability in size of generation devices and smart load devices.

The Department has provided technical assistance on this bill and looks forward to working with Congress as the legislative process moves forward.

CONCLUSION

Thank you again for the opportunity to testify before the Subcommittee today. The Department appreciates the ongoing bipartisan efforts to address our Nation's energy challenges, and looks forward to working with the Committee on the legislation on today's agenda and any future legislation. I would be happy to answer your questions.

CHANGES IN EXISTING LAW

In compliance with paragraph 12 of rule XXVI of the Standing Rules of the Senate, the Committee notes that no changes in existing law are made by S. 2702 as ordered reported.