

## Calendar No. 360

116TH CONGRESS  
1ST SESSION

# S. 2702

To require the Secretary of Energy to establish an integrated energy systems research, development, and demonstration program, and for other purposes.

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### IN THE SENATE OF THE UNITED STATES

OCTOBER 24, 2019

Mr. RISCH (for himself and Mr. MANCHIN) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

DECEMBER 17, 2019

Reported by Ms. MURKOWSKI, with an amendment

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

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## A BILL

To require the Secretary of Energy to establish an integrated energy systems research, development, and demonstration program, 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,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Integrated Energy Sys-  
5 tems Act of 2019”.

1 **SEC. 2. INTEGRATED ENERGY SYSTEMS PROGRAM.**

2 (a) DEFINITIONS.—In this section:

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

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

8 (b) ESTABLISHMENT.—

9 (1) IN GENERAL.—The Secretary shall establish  
10 a program within the Office of Nuclear Energy, to  
11 be known as the “Integrated Energy Systems Pro-  
12 gram”—

13 (A) to maximize energy production and ef-  
14 ficiency;

15 (B) to provide reliable, competitive, and  
16 environmentally sustainable electricity to the  
17 grid;

18 (C) to expand the use of emissions-reduc-  
19 ing energy technologies into nonelectric sectors  
20 to achieve dramatic reductions in environmental  
21 emissions; and

22 (D) to enable the energy infrastructure of  
23 the United States to support the quantity, vari-  
24 ability in type, and variability in size of genera-  
25 tion devices and smart load devices.

1           ~~(2) PROGRAM ADMINISTRATION; PARTNERS.—~~

2           The program shall be carried out by the Office of  
3           Nuclear Energy, in partnership with—

4                   ~~(A) multiple offices of the Department of~~  
5           Energy, including—

6                           ~~(i) the Office of Energy Efficiency~~  
7                           and Renewable Energy;

8                           ~~(ii) the Office of Fossil Energy;~~

9                           ~~(iii) the Office of Electricity; and~~

10                          ~~(iv) the Office of Cybersecurity, En-~~  
11                          ergy Security, and Emergency Response;

12                          ~~(B) National Laboratories;~~

13                          ~~(C) institutions of higher education; and~~

14                          ~~(D) the private sector.~~

15           ~~(3) GOALS AND MILESTONES.—~~The Secretary  
16           shall establish goals and milestones for the program;  
17           including the goals of—

18                          ~~(A) expanding emissions-reducing energy~~  
19                          technologies to the transportation and indus-  
20                          trial sectors by leveraging—

21                                  ~~(i) the nuclear reactor fleet of the~~  
22                                  United States;

23                                  ~~(ii) advanced nuclear;~~

24                                  ~~(iii) renewable energy;~~

1                   (iv) carbon capture, use, and storage;

2                   and

3                   (v) the energy storage resources of the

4                   United States;

5                   (B) ensuring the competitiveness of the

6                   United States in best value, emissions-reducing

7                   energy development;

8                   (C) modernizing energy infrastructure with

9                   emissions-reducing technology to promote—

10                   (i) grid stability;

11                   (ii) ramping load following;

12                   (iii) rapid start;

13                   (iv) intermittency; and

14                   (v) resiliency;

15                   (D) establishing a domestic supply chain

16                   of—

17                   (i) nuclear reactor and appurtenant

18                   equipment; and

19                   (ii) advanced coolants;

20                   (E) enhancing and accelerating domestic

21                   manufacturing and desalinization technologies

22                   and processes by optimally using clean energy

23                   sources; and

24                   (F) mitigating vulnerability to—

- 1 (i) transmission congestion on the
- 2 power grid;
- 3 (ii) cyberattack;
- 4 (iii) physical attack; and
- 5 (iv) natural phenomena.

6 (c) RESEARCH GOALS.—Research goals under the  
7 program shall include—

8 (1) technology innovation to further the expansion of emissions-reducing energy technologies to accommodate a modern, resilient grid system by—

11 (A) effectively leveraging multiple energy  
12 sources;

13 (B) enhancing and streamlining engineering design;

15 (C) carrying out process demonstrations to  
16 optimize performance;

17 (D) addressing safety by design; and

18 (E) streamlining regulatory review;

19 (2) the most efficient use of emissions-reducing  
20 energy technologies for hydrogen production to support transportation and industrial needs;

22 (3) water processing and purification to support  
23 industrial and municipal potable and cooling water  
24 needs;

1           (4) conversion of carbon feedstock (such as  
2           coal, biomass, natural gas, and refuse waste) to  
3           higher value nonelectric commodities;

4           (5) the use of carbon dioxide in nonelectric  
5           commodities;

6           (6) advanced power cycles, extraction, and pro-  
7           cessing of complex hydrocarbons to produce high-  
8           value chemicals;

9           (7) more effective thermal energy use, trans-  
10          port, and storage;

11          (8) the demonstration of nuclear energy deliv-  
12          ery for—

13                (A) the production of chemicals, metals,  
14                and fuels;

15                (B) the capture, use, and storage of car-  
16                bon; and

17                (C) renewable integration with an inte-  
18                grated energy system; and

19          (9) the development of new analysis capabilities  
20          to identify the best ways—

21                (A) to leverage multiple energy sources in  
22                a given region; and

23                (B) to quantify the benefits of integrated  
24                energy systems.

1       (d) GRANTS.—The Secretary may award grants  
2 under the program to support the goals of the program.

3       (e) AUTHORIZATION OF APPROPRIATIONS.—There is  
4 authorized to be appropriated to the Secretary to carry  
5 out the program \$50,000,000 for each of fiscal years 2020  
6 through 2029.

7 **SECTION 1. SHORT TITLE.**

8       *This Act may be cited as the “Integrated Energy Sys-*  
9 *tems Act of 2019”.*

10 **SEC. 2. INTEGRATED ENERGY SYSTEMS PROGRAM.**

11       (a) DEFINITIONS.—In this section:

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

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

17       (b) ESTABLISHMENT.—

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

21                       (A) *to maximize energy production and effi-*  
22 *ciency;*

23                       (B) *to develop energy systems involving the*  
24 *integration of nuclear energy with renewable en-*  
25 *ergy, fossil energy, and energy storage; and*

1                   (C) to expand the use of emissions-reducing  
 2                   energy technologies into nonelectric sectors to  
 3                   achieve significant reductions in environmental  
 4                   emissions.

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

8                   (A) relevant offices within the Department  
 9                   of Energy;

10                  (B) National Laboratories;

11                  (C) institutions of higher education; and

12                  (D) the private sector.

13                  (3) *GOALS AND MILESTONES.*—The Secretary  
 14                  shall establish quantitative goals and milestones for  
 15                  the program.

16                  (c) *RESEARCH AREAS.*—Research areas under the pro-  
 17                  gram may include—

18                  (1) technology innovation to further the expan-  
 19                  sion of emissions-reducing energy technologies to ac-  
 20                  commodate a modern, resilient grid system by—

21                  (A) effectively leveraging multiple energy  
 22                  sources;

23                  (B) enhancing and streamlining engineer-  
 24                  ing design;



1                   (C) carrying out process demonstrations to  
2                   optimize performance; and

3                   (D) streamlining regulatory review;

4                   (2) advanced power cycles, energy extraction,  
5                   and processing of complex hydrocarbons to produce  
6                   high-value chemicals;

7                   (3) efficient use of emissions-reducing energy  
8                   technologies for hydrogen production to support trans-  
9                   portation and industrial needs;

10                  (4) enhancement and acceleration of domestic  
11                  manufacturing and desalinization technologies and  
12                  processes by optimally using clean energy sources;

13                  (5) more effective thermal energy use, transport,  
14                  and storage;

15                  (6) the demonstration of nuclear energy delivery  
16                  for—

17                         (A) the production of chemicals, metals, and  
18                         fuels;

19                         (B) the capture, use, and storage of carbon;

20                         (C) renewable integration with an inte-  
21                         grated energy system; and

22                         (D) conversion of carbon feedstock, such as  
23                         coal, biomass, natural gas, and refuse waste, to  
24                         higher value nonelectric commodities;

1           (7) *the development of new analysis capabilities*  
2       *to identify the best ways—*

3           (A) *to leverage multiple energy sources in a*  
4       *given region; and*

5           (B) *to quantify the benefits of integrated en-*  
6       *ergy systems; and*

7           (8) *any other area that, as determined by the*  
8       *Secretary, meets the purpose and goals of the pro-*  
9       *gram.*

10       (d) *GRANTS.—The Secretary may award grants under*  
11       *the program to support the goals of the program.*

12       **SEC. 3. REPORT ON DUPLICATIVE PROGRAMS.**

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



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