

Calendar No. 183

116TH CONGRESS
1ST SESSION

S. 715

[Report No. 116–80]

To improve the productivity and energy efficiency of the manufacturing sector by directing the Secretary of Energy, in coordination with the National Academies and other appropriate Federal agencies, to develop a national smart manufacturing plan and to provide assistance to small- and medium-sized manufacturers in implementing smart manufacturing programs, and for other purposes.

IN THE SENATE OF THE UNITED STATES

MARCH 7, 2019

Mrs. SHAHEEN (for herself, Mr. ALEXANDER, and Ms. HASSAN) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

SEPTEMBER 10, 2019

Reported by Ms. MURKOWSKI, without amendment

A BILL

To improve the productivity and energy efficiency of the manufacturing sector by directing the Secretary of Energy, in coordination with the National Academies and other appropriate Federal agencies, to develop a national smart manufacturing plan and to provide assistance to small- and medium-sized manufacturers in implementing smart manufacturing programs, 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 “Smart Manufacturing
5 Leadership Act”.

6 **SEC. 2. FINDINGS.**

7 Congress finds that—

8 (1) the industrial sector—

9 (A) represents approximately 20 percent of
10 the economy of the United States;

11 (B) provides approximately 13 percent of
12 employment in the United States; and

13 (C) accounts for more than
14 30,000,000,000,000,000 Btus of energy, a
15 quantity that is equal to almost $\frac{1}{3}$ of the en-
16 ergy consumption of the United States;

17 (2) smart manufacturing is set to transform the
18 manufacturing sector and the use by the manufac-
19 turing sector of energy, water, raw materials, and
20 labor over the 10 years following the date of enact-
21 ment of this Act;

22 (3) the transformation described in paragraph
23 (2) will result in savings in electricity, natural gas,
24 transportation fuels, chemical feedstocks, and many
25 other fuels;

1 (4) the interconnection of the many components
2 of manufacturing within a manufacturing plant with
3 other business functions within a company and
4 across companies within a supply chain will enable
5 new production efficiencies;

6 (5) the improvements in automation described
7 in paragraph (4) are estimated to produce between
8 \$5,000,000,000 and \$25,000,000,000 in energy sav-
9 ings per year across the manufacturing sector for
10 electricity alone by 2035;

11 (6) smart manufacturing technologies are esti-
12 mated to add between \$10,000,000,000,000 and
13 \$15,000,000,000,000 to the global gross domestic
14 product over 20 years following the date of enact-
15 ment of this Act;

16 (7) market barriers exist to the widespread
17 adoption of smart manufacturing practices by all
18 sizes of firms and to the investment in smart manu-
19 facturing technologies, including lack of—

20 (A) common communication protocols be-
21 tween smart manufacturing devices, which pre-
22 vents interoperability, reduces system effi-
23 ciencies, and stifles innovation;

1 (B) common standards for storing and
2 sharing information relating to energy con-
3 sumption and energy savings;

4 (C) an open-access smart manufacturing
5 platform that enables the networking of busi-
6 ness and automation systems of multiple ven-
7 dors; and

8 (D) common cybersecurity protocols and
9 standards;

10 (8) addressing the barriers described in para-
11 graph (7) is in the interest of the United States;

12 (9) in response to the barriers described in
13 paragraph (7), the Secretary of Energy is working
14 with the private sector to reduce the market barriers
15 through the development of voluntary protocols and
16 standards;

17 (10) there exist many technologies of which
18 many domestic manufacturers are unaware that
19 could—

20 (A) improve the competitiveness of the do-
21 mestic manufacturers; and

22 (B) reduce the environmental impacts of
23 the domestic manufacturers;

24 (11) Federal agency action can facilitate great-
25 er economic growth through outreach and engage-

1 ment in the smart manufacturing technology area;
2 and

3 (12) the United States would benefit from a
4 concerted and focused effort to advance the adoption
5 of smart manufacturing throughout the manufac-
6 turing sector of the United States.

7 **SEC. 3. DEFINITIONS.**

8 In this Act:

9 (1) ENERGY MANAGEMENT SYSTEM.—The term
10 “energy management system” means a business
11 management process based on standards of the
12 American National Standards Institute that enables
13 an organization to follow a systematic approach in
14 achieving continual improvement of energy perform-
15 ance, including energy efficiency, security, use, and
16 consumption.

17 (2) INDUSTRIAL ASSESSMENT CENTER.—The
18 term “industrial assessment center” means a center
19 located at an institution of higher education that—

20 (A) receives funding from the Department
21 of Energy;

22 (B) provides an in-depth assessment of
23 small- and medium-size manufacturer plant
24 sites to evaluate the facilities, services, and
25 manufacturing operations of the plant site; and

(C) identifies opportunities for potential savings for small- and medium-size manufacturer plant sites from energy efficiency improvements, waste minimization, pollution prevention, and productivity improvement.

(3) INFORMATION AND COMMUNICATION TECHNOLOGY.—The term “information and communication technology” means any electronic system or equipment (including the content contained in the system or equipment) used to create, convert, communicate, or duplicate data or information, including computer hardware, firmware, software, communication protocols, networks, and data interfaces.

(4) 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)).

(5) NATIONAL LABORATORY.—The term “National Laboratory” has the meaning given the term in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801).

(6) NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM.—The term “North American Industry Classification System” means the standard used by Federal statistical agencies in classifying business

1 establishments for the purpose of collecting, ana-
2 lyzing, and publishing statistical data relating to the
3 business economy of the United States.

4 (7) SECRETARY.—The term “Secretary” means
5 the Secretary of Energy.

6 (8) SMALL AND MEDIUM MANUFACTURERS.—
7 The term “small and medium manufacturers”
8 means manufacturing firms—

9 (A) classified in the North American In-
10 dustry Classification System as any of sectors
11 31 through 33;

12 (B) with gross annual sales of less than
13 \$100,000,000;

14 (C) with fewer than 500 employees at the
15 plant site; and

16 (D) with annual energy bills totaling more
17 than \$100,000 and less than \$2,500,000.

18 (9) SMART MANUFACTURING.—The term
19 “smart manufacturing” means advanced tech-
20 nologies in information, automation, monitoring,
21 computation, sensing, modeling, and networking
22 that—

23 (A) digitally—

24 (i) simulate manufacturing production
25 lines;

- 1 (ii) operate computer-controlled man-
- 2 ufacturing equipment;
- 3 (iii) monitor and communicate pro-
- 4 duction line status; and
- 5 (iv) manage and optimize energy pro-
- 6 ductivity and cost throughout production;
- 7 (B) model, simulate, and optimize the en-
- 8 ergy efficiency of a factory building;
- 9 (C) monitor and optimize building energy
- 10 performance;
- 11 (D) model, simulate, and optimize the de-
- 12 sign of energy efficient and sustainable prod-
- 13 ucts, including the use of digital prototyping
- 14 and additive manufacturing to enhance product
- 15 design;
- 16 (E) connect manufactured products in net-
- 17 works to monitor and optimize the performance
- 18 of the networks, including automated network
- 19 operations; and
- 20 (F) digitally connect the supply chain net-
- 21 work.

22 **SEC. 4. DEVELOPMENT OF NATIONAL SMART MANUFAC-**
 23 **TURING PLAN.**

24 (a) IN GENERAL.—Not later than 3 years after the
 25 date of enactment of this Act, the Secretary, in consulta-

1 tion with the National Academies, shall develop and com-
2 plete a national plan for smart manufacturing technology
3 development and deployment to improve the productivity
4 and energy efficiency of the manufacturing sector of the
5 United States.

6 (b) CONTENT.—

7 (1) IN GENERAL.—The plan developed under
8 subsection (a) shall identify areas in which agency
9 actions by the Secretary and other heads of relevant
10 Federal agencies would—

11 (A) facilitate quicker development, deploy-
12 ment, and adoption of smart manufacturing
13 technologies and processes;

14 (B) result in greater energy efficiency and
15 lower environmental impacts for all American
16 manufacturers; and

17 (C) enhance competitiveness and strength-
18 en the manufacturing sectors of the United
19 States.

20 (2) INCLUSIONS.—Agency actions identified
21 under paragraph (1) shall include—

22 (A) an assessment of previous and current
23 actions of the Department of Energy relating to
24 smart manufacturing;

1 (B) the establishment of voluntary inter-
2 connection protocols and performance stand-
3 ards;

4 (C) the use of smart manufacturing to im-
5 prove energy efficiency and reduce emissions in
6 supply chains across multiple companies;

7 (D) actions to increase cybersecurity in
8 smart manufacturing infrastructure;

9 (E) deployment of existing research re-
10 sults; and

11 (F) the leveraging of existing high-per-
12 formance computing infrastructure.

13 (c) BIENNIAL REVISIONS.—Not later than 2 years
14 after the date on which the Secretary completes the plan
15 under subsection (a), and not less frequently than once
16 every 2 years thereafter, the Secretary shall revise the
17 plan to account for advancements in information and com-
18 munication technology and manufacturing needs.

19 (d) REPORT.—Annually until the completion of the
20 plan under subsection (a), the Secretary shall submit to
21 Congress a report on the progress made in developing the
22 plan.

23 (e) FUNDING.—The Secretary shall use unobligated
24 funds of the Department of Energy to carry out this sec-
25 tion.

1 **SEC. 5. LEVERAGING EXISTING AGENCY PROGRAMS TO AS-**
2 **SIST SMALL AND MEDIUM MANUFACTURERS.**

3 (a) FINDINGS.—Congress finds that—

4 (1) the Department of Energy has existing
5 technical assistance programs that facilitate greater
6 economic growth through outreach to and engage-
7 ment with small and medium manufacturers;

8 (2) those technical assistance programs rep-
9 resent an important conduit for increasing the
10 awareness of and providing education to small and
11 medium manufacturers regarding the opportunities
12 for implementing smart manufacturing; and

13 (3) those technical assistance programs help fa-
14 cilitate the implementation of best practices.

15 (b) EXPANSION OF TECHNICAL ASSISTANCE PRO-
16 GRAMS.—The Secretary shall expand the scope of tech-
17 nologies covered by the Industrial Assessment Centers of
18 the Department of Energy—

19 (1) to include smart manufacturing technologies
20 and practices; and

21 (2) to equip the directors of the Industrial As-
22 sessment Centers with the training and tools nec-
23 essary to provide technical assistance in smart man-
24 ufacturing technologies and practices, including en-
25 ergy management systems, to manufacturers.

1 (c) FUNDING.—The Secretary shall use unobligated
2 funds of the Department of Energy to carry out this sec-
3 tion.

4 **SEC. 6. LEVERAGING SMART MANUFACTURING INFRA-**
5 **STRUCTURE AT NATIONAL LABORATORIES.**

6 (a) STUDY.—

7 (1) IN GENERAL.—Not later than 180 days
8 after the date of enactment of this Act, the Sec-
9 retary shall conduct a study on how the Department
10 of Energy can increase access to existing high-per-
11 formance computing resources in the National Lab-
12 oratories, particularly for small and medium manu-
13 facturers.

14 (2) INCLUSIONS.—In identifying ways to in-
15 crease access to National Laboratories under para-
16 graph (1), the Secretary shall—

17 (A) focus on increasing access to the com-
18 puting facilities of the National Laboratories;
19 and

20 (B) ensure that—

21 (i) the information from the manufac-
22 turer is protected; and

23 (ii) the security of the National Lab-
24 oratory facility is maintained.

1 (3) REPORT.—Not later than 1 year after the
2 date of enactment of this Act, the Secretary shall
3 submit to Congress a report describing the results of
4 the study.

5 (b) ACTIONS FOR INCREASED ACCESS.—The Sec-
6 retary shall facilitate access to the National Laboratories
7 studied under subsection (a) for small and medium manu-
8 facturers so that small and medium manufacturers can
9 fully use the high-performance computing resources of the
10 National Laboratories to enhance the manufacturing com-
11 petitiveness of the United States.

12 **SEC. 7. STATE LEADERSHIP GRANTS.**

13 (a) FINDING.—Congress finds that the States—

14 (1) are committed to promoting domestic manu-
15 facturing and supporting robust economic develop-
16 ment activities; and

17 (2) are uniquely positioned to assist manufac-
18 turers, particularly small and medium manufactur-
19 ers, with deployment of smart manufacturing
20 through the provision of infrastructure, including—

21 (A) access to shared supercomputing facili-
22 ties;

23 (B) assistance in developing process sim-
24 ulations; and

1 (C) conducting demonstrations of the bene-
2 fits of smart manufacturing.

3 (b) GRANTS AUTHORIZED.—The Secretary may
4 make grants on a competitive basis to States for estab-
5 lishing State programs to be used as models for sup-
6 porting the implementation of smart manufacturing tech-
7 nologies.

8 (c) APPLICATION.—

9 (1) IN GENERAL.—To be eligible to receive a
10 grant under this section, a State shall submit to the
11 Secretary an application at such time, in such man-
12 ner, and containing such information as the Sec-
13 retary may require.

14 (2) CRITERIA.—The Secretary shall evaluate an
15 application for a grant under this section on the
16 basis of merit using criteria identified by the Sec-
17 retary, including—

18 (A) the breadth of academic and private
19 sector partners;

20 (B) alternate sources of funding;

21 (C) plans for dissemination of results; and

22 (D) the permanence of the infrastructure
23 to be put in place by the project.

24 (d) REQUIREMENTS.—

1 (1) TERM.—The term of a grant under this
2 section shall not exceed 3 years.

3 (2) MAXIMUM AMOUNT.—The amount of a
4 grant under this section shall be not more than
5 \$3,000,000.

6 (3) MATCHING REQUIREMENT.—Each State
7 that receives a grant under this section shall con-
8 tribute matching funds in an amount equal to not
9 less than 30 percent of the amount of the grant.

10 (e) USE OF FUNDS.—

11 (1) IN GENERAL.—A State shall use a grant
12 provided under this section—

13 (A) to provide access to shared supercom-
14 puting facilities to small and medium manufac-
15 turers;

16 (B) to fund research and development of
17 transformational manufacturing processes and
18 materials technology that advance smart manu-
19 facturing; and

20 (C) to provide tools and training to small
21 and medium manufacturers on how to adopt en-
22 ergy management systems and implement smart
23 manufacturing technologies in the facilities of
24 the small and medium manufacturers.

1 (f) EVALUATION.—The Secretary shall conduct bian-
2 nual evaluations of each grant made under this section—

3 (1) to determine the impact and effectiveness of
4 programs funded with the grant; and

5 (2) to provide guidance to States on ways to
6 better execute the program of the State.

7 (g) FUNDING.—There is authorized to be appro-
8 priated to the Secretary to carry out this section
9 \$10,000,000 for each of fiscal years 2020 through 2023.

10 **SEC. 8. REPORT.**

11 The Secretary annually shall submit to Congress and
12 make publicly available a report on the progress made in
13 advancing smart manufacturing in the United States.

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