



116TH CONGRESS
1ST SESSION

S. _____

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

Mrs. SHAHEEN (for herself and Mr. ALEXANDER) introduced the following bill; which was read twice and referred to the Committee on

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,*

1 **SECTION 1. SHORT TITLE.**

2 This Act may be cited as the “Smart Manufacturing
3 Leadership Act”.

4 **SEC. 2. FINDINGS.**

5 Congress finds that—

6 (1) the industrial sector—

7 (A) represents approximately 20 percent of
8 the economy of the United States;

9 (B) provides approximately 13 percent of
10 employment in the United States; and

11 (C) accounts for more than
12 30,000,000,000,000,000 Btus of energy, a
13 quantity that is equal to almost $\frac{1}{3}$ of the en-
14 ergy consumption of the United States;

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

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

24 (4) the interconnection of the many components
25 of manufacturing within a manufacturing plant with
26 other business functions within a company and

1 across companies within a supply chain will enable
2 new production efficiencies;

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

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

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

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

21 (B) common standards for storing and
22 sharing information relating to energy con-
23 sumption and energy savings;

24 (C) an open-access smart manufacturing
25 platform that enables the networking of busi-

1 ness and automation systems of multiple ven-
2 dors; and

3 (D) common cybersecurity protocols and
4 standards;

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

7 (9) in response to the barriers described in
8 paragraph (7), the Secretary of Energy is working
9 with the private sector to reduce the market barriers
10 through the development of voluntary protocols and
11 standards;

12 (10) there exist many technologies of which
13 many domestic manufacturers are unaware that
14 could—

15 (A) improve the competitiveness of the do-
16 mestic manufacturers; and

17 (B) reduce the environmental impacts of
18 the domestic manufacturers;

19 (11) Federal agency action can facilitate great-
20 er economic growth through outreach and engage-
21 ment in the smart manufacturing technology area;
22 and

23 (12) the United States would benefit from a
24 concerted and focused effort to advance the adoption

1 of smart manufacturing throughout the manufac-
2 turing sector of the United States.

3 **SEC. 3. DEFINITIONS.**

4 In this Act:

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

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

16 (A) receives funding from the Department
17 of Energy;

18 (B) provides an in-depth assessment of
19 small- and medium-size manufacturer plant
20 sites to evaluate the facilities, services, and
21 manufacturing operations of the plant site; and

22 (C) identifies opportunities for potential
23 savings for small- and medium-size manufac-
24 turer plant sites from energy efficiency improve-

1 ments, waste minimization, pollution preven-
2 tion, and productivity improvement.

3 (3) INFORMATION AND COMMUNICATION TECH-
4 NOLOGY.—The term “information and communica-
5 tion technology” means any electronic system or
6 equipment (including the content contained in the
7 system or equipment) used to create, convert, com-
8 municate, or duplicate data or information, including
9 computer hardware, firmware, software, communica-
10 tion protocols, networks, and data interfaces.

11 (4) INSTITUTION OF HIGHER EDUCATION.—The
12 term “institution of higher education” has the
13 meaning given the term in section 101(a) of the
14 Higher Education Act of 1965 (20 U.S.C. 1001(a)).

15 (5) NATIONAL LABORATORY.—The term “Na-
16 tional Laboratory” has the meaning given the term
17 in section 2 of the Energy Policy Act of 2005 (42
18 U.S.C. 15801).

19 (6) NORTH AMERICAN INDUSTRY CLASSIFICA-
20 TION SYSTEM.—The term “North American Indus-
21 try Classification System” means the standard used
22 by Federal statistical agencies in classifying business
23 establishments for the purpose of collecting, ana-
24 lyzing, and publishing statistical data relating to the
25 business economy of the United States.

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

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

6 (A) classified in the North American In-
7 dustry Classification System as any of sectors
8 31 through 33;

9 (B) with gross annual sales of less than
10 \$100,000,000;

11 (C) with fewer than 500 employees at the
12 plant site; and

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

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

20 (A) digitally—

21 (i) simulate manufacturing production
22 lines;

23 (ii) operate computer-controlled man-
24 ufacturing equipment;

1 (iii) monitor and communicate pro-
2 duction line status; and

3 (iv) manage and optimize energy pro-
4 ductivity and cost throughout production;

5 (B) model, simulate, and optimize the en-
6 ergy efficiency of a factory building;

7 (C) monitor and optimize building energy
8 performance;

9 (D) model, simulate, and optimize the de-
10 sign of energy efficient and sustainable prod-
11 ucts, including the use of digital prototyping
12 and additive manufacturing to enhance product
13 design;

14 (E) connect manufactured products in net-
15 works to monitor and optimize the performance
16 of the networks, including automated network
17 operations; and

18 (F) digitally connect the supply chain net-
19 work.

20 **SEC. 4. DEVELOPMENT OF NATIONAL SMART MANUFAC-**
21 **TURING PLAN.**

22 (a) IN GENERAL.—Not later than 3 years after the
23 date of enactment of this Act, the Secretary, in consulta-
24 tion with the National Academies, shall develop and com-
25 plete a national plan for smart manufacturing technology

1 development and deployment to improve the productivity
2 and energy efficiency of the manufacturing sector of the
3 United States.

4 (b) CONTENT.—

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

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

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

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

18 (2) INCLUSIONS.—Agency actions identified
19 under paragraph (1) shall include—

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

23 (B) the establishment of voluntary inter-
24 connection protocols and performance stand-
25 ards;

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

4 (D) actions to increase cybersecurity in
5 smart manufacturing infrastructure;

6 (E) deployment of existing research re-
7 sults; and

8 (F) the leveraging of existing high-per-
9 formance computing infrastructure.

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

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

20 (e) FUNDING.—The Secretary shall use unobligated
21 funds of the Department of Energy to carry out this sec-
22 tion.

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

25 (a) FINDINGS.—Congress finds that—

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

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

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

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

16 (1) to include smart manufacturing technologies
17 and practices; and

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

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

1 **SEC. 6. LEVERAGING SMART MANUFACTURING INFRA-**
2 **STRUCTURE AT NATIONAL LABORATORIES.**

3 (a) **STUDY.**—

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

11 (2) **INCLUSIONS.**—In identifying ways to in-
12 crease access to National Laboratories under para-
13 graph (1), the Secretary shall—

14 (A) focus on increasing access to the com-
15 puting facilities of the National Laboratories;
16 and

17 (B) ensure that—

18 (i) the information from the manufac-
19 turer is protected; and

20 (ii) the security of the National Lab-
21 oratory facility is maintained.

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

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

8 **SEC. 7. STATE LEADERSHIP GRANTS.**

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

10 (1) are committed to promoting domestic manu-
11 facturing and supporting robust economic develop-
12 ment activities; and

13 (2) are uniquely positioned to assist manufac-
14 turers, particularly small and medium manufactur-
15 ers, with deployment of smart manufacturing
16 through the provision of infrastructure, including—

17 (A) access to shared supercomputing facili-
18 ties;

19 (B) assistance in developing process sim-
20 ulations; and

21 (C) conducting demonstrations of the bene-
22 fits of smart manufacturing.

23 (b) GRANTS AUTHORIZED.—The Secretary may
24 make grants on a competitive basis to States for estab-
25 lishing State programs to be used as models for sup-

1 porting the implementation of smart manufacturing tech-
2 nologies.

3 (c) APPLICATION.—

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

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

13 (A) the breadth of academic and private
14 sector partners;

15 (B) alternate sources of funding;

16 (C) plans for dissemination of results; and

17 (D) the permanence of the infrastructure
18 to be put in place by the project.

19 (d) REQUIREMENTS.—

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

22 (2) MAXIMUM AMOUNT.—The amount of a
23 grant under this section shall be not more than
24 \$3,000,000.

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

5 (e) USE OF FUNDS.—

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

8 (A) to provide access to shared supercom-
9 puting facilities to small and medium manufac-
10 turers;

11 (B) to fund research and development of
12 transformational manufacturing processes and
13 materials technology that advance smart manu-
14 facturing; and

15 (C) to provide tools and training to small
16 and medium manufacturers on how to adopt en-
17 ergy management systems and implement smart
18 manufacturing technologies in the facilities of
19 the small and medium manufacturers.

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

22 (1) to determine the impact and effectiveness of
23 programs funded with the grant; and

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

1 (g) FUNDING.—There is authorized to be appro-
2 priated to the Secretary to carry out this section
3 \$10,000,000 for each of fiscal years 2020 through 2023.

4 **SEC. 8. REPORT.**

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