

114TH 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.

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IN THE SENATE OF THE UNITED STATES

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Mrs. SHAHEEN introduced the following bill; which was read twice and referred to the Committee on \_\_\_\_\_

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**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 a set of advanced  
17           sensing, instrumentation, monitoring, controls, and  
18           process optimization technologies and practices that  
19           merge information and communication technologies  
20           with the manufacturing environment for the real-  
21           time management of energy, productivity, and costs  
22           across factories and companies.

1   **SEC. 4. DEVELOPMENT OF NATIONAL SMART MANUFAC-**  
2                   **TURING PLAN.**

3           (a) IN GENERAL.—Not later than 3 years after the  
4   date of enactment of this Act, the Secretary, in consulta-  
5   tion with the National Academies, shall develop and com-  
6   plete a national plan for smart manufacturing technology  
7   development and deployment to improve the productivity  
8   and energy efficiency of the manufacturing sector of the  
9   United States.

10          (b) CONTENT.—

11               (1) IN GENERAL.—The plan developed under  
12   subsection (a) shall identify areas in which agency  
13   actions by the Secretary and other heads of relevant  
14   Federal agencies would—

15                   (A) facilitate quicker development, deploy-  
16                   ment, and adoption of smart manufacturing  
17                   technologies and processes;

18                   (B) result in greater energy efficiency and  
19                   lower environmental impacts for all American  
20                   manufacturers; and

21                   (C) enhance competitiveness and strength-  
22                   en the manufacturing sectors of the United  
23                   States.

24               (2) INCLUSIONS.—Agency actions identified  
25   under paragraph (1) shall include—



1 (A) an assessment of previous and current  
2 actions of the Department of Energy relating to  
3 smart manufacturing;

4 (B) the establishment of voluntary inter-  
5 connection protocols and performance stand-  
6 ards;

7 (C) deployment of existing research re-  
8 sults; and

9 (D) the leveraging of existing high-per-  
10 formance computing infrastructure.

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

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

21 (e) FUNDING.—The Secretary shall use unobligated  
22 funds of the Department of Energy to carry out this sec-  
23 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 grand 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 imple-  
22 ment smart manufacturing technologies in the  
23 facilities of the small and medium manufactur-  
24 ers.

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 2017 through 2020.

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.