

# Union Calendar No. 161

117<sup>TH</sup> CONGRESS  
2<sup>D</sup> SESSION

# H. R. 4599

[Report No. 117-227]

To strengthen and enhance the competitiveness of American manufacturing through the research and development of advanced technologies to reduce steelmaking emissions, and for other purposes.

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## IN THE HOUSE OF REPRESENTATIVES

JULY 21, 2021

Mr. GONZALEZ of Ohio (for himself and Mr. LAMB) introduced the following bill; which was referred to the Committee on Science, Space, and Technology

JANUARY 18, 2022

Additional sponsors: Mr. MCKINLEY, Ms. WILD, Mrs. MILLER-MEEKS, Mr. MRVAN, Mr. DELGADO, and Mr. ROGERS of Kentucky

JANUARY 18, 2022

Reported with an amendment, committed to the Committee of the Whole House on the State of the Union, and ordered to be printed

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

[For text of introduced bill, see copy of bill as introduced on July 21, 2021]

# **A BILL**

To strengthen and enhance the competitiveness of American manufacturing through the research and development of advanced technologies to reduce steelmaking emissions, 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 “Steel Upgrading Part-*  
5 *nerships and Emissions Reduction Act” or the “SUPER*  
6 *Act of 2021”.*

7 **SEC. 2. LOW-EMISSIONS STEEL MANUFACTURING RE-**  
8 **SEARCH PROGRAM.**

9        *(a) PROGRAM.—Subtitle D of title IV of the Energy*  
10 *Independence and Security Act of 2007 (42 U.S.C. 17111*  
11 *et seq.) is amended by inserting after section 454 the fol-*  
12 *lowing:*

13 **“SEC. 454A. LOW-EMISSIONS STEEL MANUFACTURING RE-**  
14 **SEARCH PROGRAM.**

15        *“(a) PURPOSE.—The purpose of this section is to en-*  
16 *courage the research and development of innovative tech-*  
17 *nologies aimed at—*

18            *“(1) increasing the technological and economic*  
19 *competitiveness of industry and manufacturing in the*  
20 *United States; and*

21            *“(2) achieving significant net nonwater green-*  
22 *house emissions reductions in the production processes*  
23 *for iron, steel, and steel mill products.*

24        *“(b) DEFINITIONS.—In this section:*

1           “(1)           COMMERCIALLY           AVAILABLE  
2           STEELMAKING.—The term ‘commercially available  
3           steelmaking’ means the current production method of  
4           iron, steel, and steel mill products.

5           “(2) CRITICAL MATERIAL.—The term ‘critical  
6           material’ has the meaning given such term in section  
7           7002 of division Z of the Consolidated Appropriations  
8           Act, 2021 (Public Law 116–260).

9           “(3) CRITICAL MINERAL.—The term ‘critical  
10          mineral’ has the meaning given such term in section  
11          7002 of division Z of the Consolidated Appropriations  
12          Act, 2021 (Public Law 116–260).

13          “(4) ELIGIBLE ENTITY.—The term ‘eligible enti-  
14          ty’ means—

15                  “(A) an institution of higher education;

16                  “(B) an appropriate State or Federal enti-  
17          ty, including a federally funded research and de-  
18          velopment center of the Department;

19                  “(C) a nonprofit research institution;

20                  “(D) a private entity;

21                  “(E) any other relevant entity the Secretary  
22          determines appropriate; and

23                  “(F) a partnership or consortium of two or  
24          more entities described in subparagraphs (A)  
25          through (E).

1           “(5) *LOW-EMISSIONS STEEL MANUFACTURING.*—  
2           *The term ‘low-emissions steel manufacturing’ means*  
3           *advanced or commercially available steelmaking with*  
4           *the reduction, to the maximum extent practicable, of*  
5           *net nonwater greenhouse gas emissions to the atmos-*  
6           *phere from the production of iron, steel, and steel mill*  
7           *products.*

8           “(c) *IN GENERAL.*—*Not later than 180 days after the*  
9           *date of enactment of the Steel Upgrading Partnerships and*  
10           *Emissions Reduction Act, the Secretary shall establish a*  
11           *program of research, development, demonstration, and com-*  
12           *mercial application of advanced tools, technologies, and*  
13           *methods for low-emissions steel manufacturing.*

14           “(d) *REQUIREMENTS.*—*In carrying out the program*  
15           *under subsection (c), the Secretary shall—*

16                   “(1) *coordinate this program with the programs*  
17                   *and activities authorized in title VI of division Z of*  
18                   *the Consolidated Appropriations Act, 2021;*

19                   “(2) *coordinate across all relevant program of-*  
20                   *fices of the Department, including the Office of*  
21                   *Science, Office of Energy Efficiency and Renewable*  
22                   *Energy, the Office of Fossil Energy, and the Office of*  
23                   *Nuclear Energy;*

24                   “(3) *leverage, to the extent practicable, the re-*  
25                   *search infrastructure of the Department, including*

1 *scientific computing user facilities, x-ray light*  
2 *sources, neutron scattering facilities, and nanoscale*  
3 *science research centers; and*

4 *“(4) conduct research, development, and dem-*  
5 *onstration of low-emissions steel manufacturing tech-*  
6 *nologies that have the potential to increase domestic*  
7 *production and employment in advanced and com-*  
8 *mercially available steelmaking.*

9 *“(e) STRATEGIC PLAN.—*

10 *“(1) IN GENERAL.—Not later than 180 days*  
11 *after the date of enactment of the Steel Upgrading*  
12 *Partnerships and Emissions Reduction Act, the Sec-*  
13 *retary shall develop a 5-year strategic plan identi-*  
14 *fying research, development, demonstration, and com-*  
15 *mercial application goals for the program established*  
16 *in subsection (c). The Secretary shall submit this*  
17 *plan to the Committee on Science, Space, and Tech-*  
18 *nology of the House of Representatives and the Com-*  
19 *mittee on Energy and Natural Resources of the Sen-*  
20 *ate.*

21 *“(2) CONTENTS.—The strategic plan submitted*  
22 *under paragraph (1) shall—*

23 *“(A) identify programs at the Department*  
24 *related to low-emissions steel manufacturing that*  
25 *support the research, development, demonstra-*

1            *tion, and commercial application activities de-*  
2            *scribed in this section, and the demonstration*  
3            *projects under subsection (h);*

4            *“(B) establish technological and pro-*  
5            *grammatic goals to achieve the requirements of*  
6            *subsection (d); and*

7            *“(C) include timelines for the accomplish-*  
8            *ment of goals developed under the plan.*

9            *“(3) UPDATES TO PLAN.—Not less than once*  
10          *every two years, the Secretary shall submit to the*  
11          *Committee on Science, Space, and Technology of the*  
12          *House of Representatives and the Committee on En-*  
13          *ergy and Natural Resources of the Senate an updated*  
14          *version of the plan under paragraph (1).*

15          *“(f) FOCUS AREAS.—In carrying out the program es-*  
16          *tablished in subsection (c), the Secretary shall focus on—*

17                  *“(1) medium- and high-temperature heat genera-*  
18                  *tion technologies used for low-emissions steel manu-*  
19                  *facturing, which may include—*

20                          *“(A) alternative fuels, including hydrogen*  
21                          *and biomass;*

22                          *“(B) alternative reducing agents, including*  
23                          *hydrogen;*

24                          *“(C) renewable heat generation technology,*  
25                          *including solar and geothermal;*

1           “(D) electrification of heating processes, in-  
2           cluding through electrolysis; and

3           “(E) other heat generation sources;

4           “(2) carbon capture technologies for advanced  
5           and commercially available steelmaking processes,  
6           which may include—

7           “(A) combustion and chemical looping tech-  
8           nologies;

9           “(B) use of slag to reduce carbon dioxide  
10          emissions;

11          “(C) pre-combustion technologies; and

12          “(D) post-combustion technologies;

13          “(3) smart manufacturing technologies and prin-  
14          ciples, digital manufacturing technologies, and ad-  
15          vanced data analytics to develop advanced tech-  
16          nologies and practices in information, automation,  
17          monitoring, computation, sensing, modeling, and net-  
18          working to—

19          “(A) model and simulate manufacturing  
20          production lines;

21          “(B) monitor and communicate production  
22          line status; and

23          “(C) model, simulate, and optimize the en-  
24          ergy efficiency of manufacturing processes;



1           “(4) technologies and practices that minimize  
2 energy and natural resource consumption, which may  
3 include—

4                   “(A) designing products that enable reuse,  
5 refurbishment, remanufacturing, and recycling;

6                   “(B) minimizing waste from advanced and  
7 commercially available steelmaking processes, in-  
8 cluding through the reuse of waste as resources  
9 in other industrial processes for mutual benefit;

10                   “(C) increasing resource efficiency; and

11                   “(D) increasing the energy efficiency of ad-  
12 vanced and commercially available steelmaking  
13 processes;

14           “(5) alternative materials and technologies that  
15 produce fewer emissions during production and result  
16 in fewer emissions during use, which may include—

17                   “(A) innovative raw materials;

18                   “(B) high-performance lightweight mate-  
19 rials;

20                   “(C) substitutions for critical materials and  
21 critical minerals; and

22                   “(D) other technologies that achieve signifi-  
23 cant carbon emission reductions in low-emissions  
24 steel manufacturing, as determined by the Sec-  
25 retary; and

1           “(6) *high-performance computing to develop ad-*  
2           *vanced materials and manufacturing processes con-*  
3           *tributing to the focus areas described in paragraphs*  
4           *(1) through (5), including—*

5                     “(A) *modeling, simulation, and optimiza-*  
6                     *tion of the design of energy efficient and sustain-*  
7                     *able products; and*

8                     “(B) *the use of digital prototyping and ad-*  
9                     *ditive manufacturing to enhance product design.*

10           “(g) *TESTING AND VALIDATION.—The Secretary, in*  
11           *consultation with the Director of the National Institute of*  
12           *Standards and Technology, shall support the development*  
13           *of standardized testing and technical validation of ad-*  
14           *vanced and commercially available steelmaking and low-*  
15           *emissions steel manufacturing through collaboration with*  
16           *one or more National Laboratories, and one or more eligible*  
17           *entities.*

18           “(h) *DEMONSTRATION.—*

19                     “(1) *ESTABLISHMENT.—Not later than 180 days*  
20                     *after the date of enactment of the Steel Upgrading*  
21                     *Partnerships and Emissions Reduction Act, the Sec-*  
22                     *retary, in carrying out the program established in*  
23                     *subsection (c), and in collaboration with industry*  
24                     *partners, institutions of higher education, and the*  
25                     *National Laboratories, shall support an initiative for*

1 *the demonstration of low-emissions steel manufactur-*  
2 *ing, as identified by the Secretary, that uses ei-*  
3 *ther—*

4 *“(A) a single technology; or*

5 *“(B) a combination of multiple technologies.*

6 *“(2) SELECTION REQUIREMENTS.—Under the*  
7 *initiative established under paragraph (1), the Sec-*  
8 *retary shall select eligible entities to carry out dem-*  
9 *onstration projects and to the maximum extent prac-*  
10 *ticable—*

11 *“(A) encourage regional diversity among el-*  
12 *igible entities, including participation by rural*  
13 *States;*

14 *“(B) encourage technological diversity*  
15 *among eligible entities; and*

16 *“(C) ensure that specific projects selected—*

17 *“(i) expand on the existing technology*  
18 *demonstration programs of the Department;*  
19 *and*

20 *“(ii) prioritize projects that leverage*  
21 *matching funds from non-Federal sources.*

22 *“(3) REPORTS.—The Secretary shall submit to*  
23 *the Committee on Science, Space, and Technology of*  
24 *the House of Representatives and the Committee on*  
25 *Energy and Natural Resources of the Senate—*

1           “(A) not less frequently than once every two  
2           years for the duration of the demonstration ini-  
3           tiative under this subsection, a report describing  
4           the performance of the initiative; and

5           “(B) if the initiative established under this  
6           subsection is terminated, an assessment of the  
7           success of, and education provided by, the meas-  
8           ures carried out by recipients of financial assist-  
9           ance under the initiative.

10          “(i) *ADDITIONAL COORDINATION.*—

11           “(1) *MANUFACTURING U.S.A.*—In carrying out  
12          this section the Secretary shall consider—

13           “(A) leveraging the resources of relevant ex-  
14           isting Manufacturing USA Institutes described  
15           in section 34(d) of the National Institute of  
16           Standards and Technology Act (15 U.S.C.  
17           278s(d));

18           “(B) integrating program activities into a  
19           relevant existing Manufacturing USA Institute;  
20           or

21           “(C) establishing a new institute focused on  
22           low-emissions steel manufacturing.

23           “(2) *OTHER FEDERAL AGENCIES.*—In carrying  
24          out this section, the Secretary shall coordinate with  
25          other Federal agencies that are carrying out research

1       *and development initiatives to increase industrial*  
2       *competitiveness and achieve significant net nonwater*  
3       *greenhouse emissions reductions through low-emis-*  
4       *sions steel manufacturing, including the Department*  
5       *of Defense, Department of Transportation, and the*  
6       *National Institute of Standards and Technology.”.*

7       **(b) CLERICAL AMENDMENT.**—*Section 1(b) of the En-*  
8       *ergy Independence and Security Act of 2007 (42 U.S.C.*  
9       *17001 note) is amended in the table of contents by inserting*  
10      *after the item relating to section 454 the following:*

*“Sec. 454A. Low-Emissions Steel Manufacturing Research Program.”.*

Union Calendar No. 161

117<sup>TH</sup> CONGRESS  
2<sup>D</sup> SESSION

**H. R. 4599**

[Report No. 117-227]

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**A BILL**

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JANUARY 18, 2022

Reported with an amendment, committed to the Committee of the Whole House on the State of the Union, and ordered to be printed