

117TH CONGRESS  
1ST SESSION

# H. R. 4599

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

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## 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”.

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

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

7 **“SEC. 454A. LOW-EMISSIONS STEEL MANUFACTURING RE-**  
 8 **SEARCH PROGRAM.**

9 “(a) PURPOSE.—The purpose of this section is to en-  
 10 courage the research and development of innovative tech-  
 11 nologies aimed at—

12 “(1) increasing the technological and economic  
 13 competitiveness of industry and manufacturing in  
 14 the United States; and

15 “(2) achieving significant net nonwater green-  
 16 house emissions reductions in the production proc-  
 17 esses for iron, steel, and steel mill products.

18 “(b) DEFINITIONS.—In this section:

19 “(1) **COMMERCIALLY AVAILABLE**  
 20 **STEELMAKING.**—The term ‘commercially available  
 21 steelmaking’ means the current production method  
 22 of iron, steel, and steel mill products.

23 “(2) **CRITICAL MATERIAL.**—The term ‘critical  
 24 material’ has the meaning given such term in section  
 25 7002 of division Z of the Consolidated Appropria-  
 26 tions Act, 2021 (Public Law 116–260).

1           “(3) CRITICAL MINERAL.—The term ‘critical  
2 mineral’ has the meaning given such term in section  
3 7002 of division Z of the Consolidated Appropria-  
4 tions Act, 2021 (Public Law 116–260).

5           “(4) ELIGIBLE ENTITY.—The term ‘eligible en-  
6 tity’ means—

7                   “(A) an institution of higher education;

8                   “(B) an appropriate State or Federal enti-  
9 ty, including a federally funded research and  
10 development center of the Department;

11                   “(C) a nonprofit research institution;

12                   “(D) a private entity;

13                   “(E) any other relevant entity the Sec-  
14 retary determines appropriate; and

15                   “(F) a partnership or consortium of two or  
16 more entities described in subparagraphs (A)  
17 through (E).

18           “(5) LOW-EMISSIONS STEEL MANUFAC-  
19 TURING.—The term ‘low-emissions steel manufac-  
20 turing’ means advanced or commercially available  
21 steelmaking with the reduction, to the maximum ex-  
22 tent practicable, of net nonwater greenhouse gas  
23 emissions to the atmosphere from the production of  
24 iron, steel, and steel mill products.

1       “(c) IN GENERAL.—Not later than 180 days after  
2 the date of enactment of the Steel Upgrading Partnerships  
3 and Emissions Reduction Act, the Secretary shall estab-  
4 lish a program of research, development, demonstration,  
5 and commercial application of advanced tools, tech-  
6 nologies, and methods for low-emissions steel manufac-  
7 turing.

8       “(d) REQUIREMENTS.—In carrying out the program  
9 under subsection (c), the Secretary shall—

10           “(1) coordinate this program with the programs  
11 and activities authorized in title VI of division Z of  
12 the Consolidated Appropriations Act, 2021;

13           “(2) coordinate across all relevant program of-  
14 fices of the Department, including the Office of  
15 Science, Office of Energy Efficiency and Renewable  
16 Energy, the Office of Fossil Energy, and the Office  
17 of Nuclear Energy;

18           “(3) leverage, to the extent practicable, the re-  
19 search infrastructure of the Department, including  
20 scientific computing user facilities, x-ray light  
21 sources, neutron scattering facilities, and nanoscale  
22 science research centers; and

23           “(4) conduct research, development, and dem-  
24 onstration of low-emissions steel manufacturing  
25 technologies that have the potential to increase do-

1       mestic production and employment in advanced and  
2       commercially available steelmaking.

3       “(e) STRATEGIC PLAN.—

4               “(1) IN GENERAL.—Not later than 180 days  
5       after the date of enactment of the Steel Upgrading  
6       Partnerships and Emissions Reduction Act, the Sec-  
7       retary shall develop a 5-year strategic plan identi-  
8       fying research, development, demonstration, and  
9       commercial application goals for the program in ac-  
10      cordance with this section. The Secretary shall sub-  
11      mit this plan to the Committee on Science, Space,  
12      and Technology of the House of Representatives and  
13      the Committee on Energy and Natural Resources of  
14      the Senate.

15              “(2) CONTENTS.—The strategic plan submitted  
16      under paragraph (1) shall—

17                      “(A) identify programs at the Department  
18                      related to low-emissions steel manufacturing  
19                      that support the research, development, dem-  
20                      onstration, and commercial application activities  
21                      described in this section, and the demonstration  
22                      projects under subsection (h);

23                      “(B) establish technological and pro-  
24                      grammatic goals to achieve the requirements of  
25                      subsection (d); and

1           “(C) include timelines for the accomplish-  
2           ment of goals developed under the plan.

3           “(3) UPDATES TO PLAN.—Not less than once  
4           every two years, the Secretary shall submit to the  
5           Committee on Science, Space, and Technology of the  
6           House of Representatives and the Committee on En-  
7           ergy and Natural Resources of the Senate an up-  
8           dated version of the plan under paragraph (1).

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

11           “(1) medium- and high-temperature heat gen-  
12          eration technologies used for low-emissions steel  
13          manufacturing, which may include—

14           “(A) alternative fuels, including hydrogen  
15          and biomass;

16           “(B) alternative reducing agents, including  
17          hydrogen;

18           “(C) renewable heat generation technology,  
19          including solar and geothermal;

20           “(D) electrification of heating processes,  
21          including through electrolysis; and

22           “(E) other heat generation sources;

23           “(2) carbon capture technologies for advanced  
24          and commercially available steelmaking processes,  
25          which may include—

1           “(A) combustion and chemical looping  
2 technologies;

3           “(B) use of slag for carbon dioxide re-  
4 moval;

5           “(C) pre-combustion technologies; and

6           “(D) post-combustion technologies;

7           “(3) smart manufacturing technologies and  
8 principles, digital manufacturing technologies, and  
9 advanced data analytics to develop advanced tech-  
10 nologies and practices in information, automation,  
11 monitoring, computation, sensing, modeling, and  
12 networking to—

13           “(A) model and simulate manufacturing  
14 production lines;

15           “(B) monitor and communicate production  
16 line status; and

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

19           “(4) technologies and practices that minimize  
20 energy and natural resource consumption, which  
21 may include—

22           “(A) designing products that enable reuse,  
23 refurbishment, remanufacturing, and recycling;

24           “(B) minimizing waste from advanced and  
25 commercially available steelmaking processes,

1 including through the reuse of waste as re-  
2 sources in other industrial processes for mutual  
3 benefit;

4 “(C) increasing resource efficiency; and

5 “(D) increasing the energy efficiency of  
6 advanced and commercially available steelmak-  
7 ing processes;

8 “(5) alternative materials and technologies that  
9 produce fewer emissions during production and re-  
10 sult in fewer emissions during use, which may in-  
11 clude—

12 “(A) innovative raw materials;

13 “(B) high-performance lightweight mate-  
14 rials;

15 “(C) substitutions for critical materials  
16 and critical minerals; and

17 “(D) other technologies that achieve sig-  
18 nificant carbon emission reductions in low-emis-  
19 sions steel manufacturing, as determined by the  
20 Secretary; and

21 “(6) high-performance computing to develop ad-  
22 vanced materials and manufacturing processes con-  
23 tributing to the focus areas described in paragraphs  
24 (1) through (5), including—



1                   “(A) modeling, simulation, and optimiza-  
2                   tion of the design of energy efficient and sus-  
3                   tainable products; and

4                   “(B) the use of digital prototyping and ad-  
5                   ditive manufacturing to enhance product de-  
6                   sign.

7           “(g) TESTING AND VALIDATION.—The Secretary, in  
8   consultation with the National Institute of Standards and  
9   Technology, shall support the development of standardized  
10   testing and technical validation of advanced and commer-  
11   cially available steelmaking and low-emissions steel manu-  
12   facturing through collaboration with one or more National  
13   Laboratories, and one or more eligible entities.

14           “(h) DEMONSTRATION.—

15                   “(1) ESTABLISHMENT.—Beginning on the date  
16                   of enactment of the Steel Upgrading Partnerships  
17                   and Emissions Reduction Act, the Secretary, in col-  
18                   laboration with industry partners, institutions of  
19                   higher education, and the National Laboratories,  
20                   shall support an initiative for the demonstration of  
21                   low-emissions steel manufacturing, as identified by  
22                   the Secretary, that uses either—

23                           “(A) a single technology; or

24                           “(B) a combination of multiple tech-  
25                   nologies.

1           “(2) SELECTION REQUIREMENTS.—In selecting  
2           eligible entities for the demonstration projects under  
3           this subsection, the Secretary shall, to the maximum  
4           extent practicable—

5                   “(A) encourage regional diversity among  
6                   eligible entities, including participation by rural  
7                   States;

8                   “(B) encourage technological diversity  
9                   among eligible entities; and

10                  “(C) ensure that specific projects se-  
11                  lected—

12                          “(i) expand on the existing technology  
13                          demonstration programs of the Depart-  
14                          ment; and

15                          “(ii) prioritize projects that leverage  
16                          matching funds from non-Federal sources.

17           “(3) REPORTS.—The Secretary shall submit to  
18           the Committee on Science, Space, and Technology of  
19           the House of Representatives and the Committee on  
20           Energy and Natural Resources of the Senate—

21                   “(A) not less frequently than once every  
22                   two years for the duration of the demonstration  
23                   program under this subsection, a report de-  
24                   scribing the performance of the program; and

1 “(B) if the program established under this  
2 subsection is terminated, an assessment of the  
3 success of, and education provided by, the  
4 measures carried out by recipients of financial  
5 assistance under the program.

6 “(i) ADDITIONAL COORDINATION.—

7 “(1) MANUFACTURING U.S.A.—In carrying out  
8 this section the Secretary shall consider—

9 “(A) leveraging the resources of relevant  
10 existing Manufacturing USA Institutes de-  
11 scribed in section 34(d) of the National Insti-  
12 tute of Standards and Technology Act (15  
13 U.S.C. 278s(d));

14 “(B) integrating program activities into a  
15 relevant existing Manufacturing USA Institute;  
16 or

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

19 “(2) OTHER FEDERAL AGENCIES.—In carrying  
20 out this section, the Secretary shall coordinate with  
21 other Federal agencies that are carrying out re-  
22 search and development initiatives to increase indus-  
23 trial competitiveness and achieve significant net  
24 nonwater greenhouse emissions reductions through  
25 low-emissions steel manufacturing, including the De-

1       partment of Defense, Department of Transportation,  
2       and the National Institute of Standards and Tech-  
3       nology.”.

4       (b) CLERICAL AMENDMENT.—Section 1(b) of the  
5       Energy Independence and Security Act of 2007 (42  
6       U.S.C. 17001 note) is amended in the table of contents  
7       by inserting after the item relating to section 454 the fol-  
8       lowing:

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

