117TH CONGRESS
2D SESSION

# S. 4559

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 SENATE OF THE UNITED STATES

JULY 19, 2022

Mr. CASEY introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

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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.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

**SECTION 1. SHORT TITLE.**

This Act may be cited as the ''Steel Upgrading Partnerships and Emissions Reduction Act of 2022'' or the ''SUPER Act of 2022''.

**SEC. 2. LOW-EMISSIONS STEEL MANUFACTURING RESEARCH PROGRAM.**

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

**"SEC. 454A. LOW-EMISSIONS STEEL MANUFACTURING RESEARCH PROGRAM.**

''(a) PURPOSE.—The purpose of this section is to encourage the research and development of innovative technologies aimed at—

''(1) increasing the technological and economic competitiveness of industry and manufacturing in the United States; and

''(2) achieving significant net nonwater greenhouse emissions reductions in the production processes for iron, steel, and steel mill products.

''(b) DEFINITIONS.—In this section:

''(1) COMMERCIALLY AVAILABLE STEELMAKING.—The term 'commercially available steelmaking' means the current production method of iron, steel, and steel mill products.

''(2) CRITICAL MATERIAL.—The term 'critical material' has the meaning given such term in section 7002 of the Energy Act of 2020 (30 U.S.C. 1606).

''(3) CRITICAL MINERAL.—The term 'critical mineral' has the meaning given such term in section 7002 of the Energy Act of 2020 (30 U.S.C. 1606).

''(4) ELIGIBLE ENTITY.—The term 'eligible entity' means—

''(A) an institution of higher education;

''(B) an appropriate State or Federal entity, including a federally funded research and development center of the Department;

''(C) a nonprofit research institution;

''(D) a private entity;

''(E) any other relevant entity the Secretary determines appropriate; and

''(F) a partnership or consortium of two or more entities described in subparagraphs (A) through (E).

''(5) LOW-EMISSIONS STEEL MANUFACTURING.—The term 'low-emissions steel manufacturing' means advanced or commercially available steelmaking with the reduction, to the maximum extent practicable, of net nonwater greenhouse gas emissions to the atmosphere from the production of iron, steel, and steel mill products.

''(c) IN GENERAL.—Not later than 180 days after the date of enactment of the Steel Upgrading Partnerships

and Emissions Reduction Act of 2022, the Secretary shall establish a program of research, development, demonstration, and commercial application of advanced tools, technologies, and methods for low-emissions steel manufacturing.

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

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

''(2) coordinate across all relevant program offices of the Department, including the Office of Science, Office of Energy Efficiency and Renewable Energy, the Office of Fossil Energy, and the Office of Nuclear Energy;

''(3) leverage, to the extent practicable, the research infrastructure of the Department, including scientific computing user facilities, x-ray light sources, neutron scattering facilities, and nanoscale science research centers; and

''(4) conduct research, development, and demonstration of low-emissions steel manufacturing technologies that have the potential to increase domestic production and employment in advanced and commercially available steelmaking.

''(e) STRATEGIC PLAN.—

''(1) IN GENERAL.—Not later than 180 days after the date of enactment of the Steel Upgrading Partnerships and Emissions Reduction Act of 2022, the Secretary shall develop a 5-year strategic plan identifying research, development, demonstration, and commercial application goals for the program established in subsection (c). The Secretary shall submit this plan to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate.

''(2) CONTENTS.—The strategic plan submitted under paragraph (1) shall—

''(A) identify programs at the Department related to low-emissions steel manufacturing that support the research, development, demonstration, and commercial application activities described in this section, and the demonstration projects under subsection (h);

''(B) establish technological and programmatic goals to achieve the requirements of subsection (d); and

''(C) include timelines for the accomplishment of goals developed under the plan.

''(3) UPDATES TO PLAN.—Not less than once every two years, the Secretary shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate an updated version of the plan under paragraph (1).

''(f) FOCUS AREAS.—In carrying out the program established in subsection (c), the Secretary shall focus on—

''(1) medium- and high-temperature heat generation technologies used for low-emissions steel manufacturing, which may include—

''(A) alternative fuels, including hydrogen and biomass;

''(B) alternative reducing agents, including hydrogen;

''(C) renewable heat generation technology, including solar and geothermal;

''(D) electrification of heating processes, including through electrolysis; and

''(E) other heat generation sources;

''(2) carbon capture technologies for advanced and commercially available steelmaking processes, which may include—

''(A) combustion and chemical looping technologies;

"(B) use of slag to reduce carbon dioxide emissions;

"(C) pre-combustion technologies; and

"(D) post-combustion technologies;

"(3) smart manufacturing technologies and principles, digital manufacturing technologies, and advanced data analytics to develop advanced technologies and practices in information, automation, monitoring, computation, sensing, modeling, and networking to—

"(A) model and simulate manufacturing production lines;

"(B) monitor and communicate production line status; and

"(C) model, simulate, and optimize the energy efficiency of manufacturing processes;

"(4) technologies and practices that minimize energy and natural resource consumption, which may include—

"(A) designing products that enable reuse, refurbishment, remanufacturing, and recycling;

"(B) minimizing waste from advanced and commercially available steelmaking processes, including through the reuse of waste as re-

sources in other industrial processes for mutual benefit;

''(C) increasing resource efficiency; and

''(D) increasing the energy efficiency of advanced and commercially available steelmaking processes;

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

''(A) innovative raw materials;

''(B) high-performance lightweight materials;

''(C) substitutions for critical materials and critical minerals; and

''(D) other technologies that achieve significant carbon emission reductions in low-emissions steel manufacturing, as determined by the Secretary; and

''(6) high-performance computing to develop advanced materials and manufacturing processes contributing to the focus areas described in paragraphs (1) through (5), including—

"(A) modeling, simulation, and optimization of the design of energy efficient and sustainable products; and

"(B) the use of digital prototyping and additive manufacturing to enhance product design.

"(g) TESTING AND VALIDATION.—The Secretary, in consultation with the Director of the National Institute of Standards and Technology, shall support the development of standardized testing and technical validation of advanced and commercially available steelmaking and low-emissions steel manufacturing through collaboration with one or more National Laboratories, and one or more eligible entities.

"(h) DEMONSTRATION.—

"(1) ESTABLISHMENT.—Not later than 180 days after the date of enactment of the Steel Upgrading Partnerships and Emissions Reduction Act of 2022, the Secretary, in carrying out the program established in subsection (c), and in collaboration with industry partners, institutions of higher education, and the National Laboratories, shall support an initiative for the demonstration of low-emissions steel manufacturing, as identified by the Secretary, that uses either—

"(A) a single technology; or

"(B) a combination of multiple technologies.

"(2) SELECTION REQUIREMENTS.—Under the initiative established under paragraph (1), the Secretary shall select eligible entities to carry out demonstration projects and to the maximum extent practicable—

"(A) encourage regional diversity among eligible entities, including participation by rural States;

"(B) encourage technological diversity among eligible entities; and

"(C) ensure that specific projects selected—

"(i) expand on the existing technology demonstration programs of the Department; and

"(ii) prioritize projects that leverage matching funds from non-Federal sources.

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

''(A) not less frequently than once every two years for the duration of the demonstration initiative under this subsection, a report describing the performance of the initiative; and

''(B) if the initiative established under this subsection is terminated, an assessment of the success of, and education provided by, the measures carried out by recipients of financial assistance under the initiative.

''(i) ADDITIONAL COORDINATION.—

''(1) MANUFACTURING USA.—In carrying out this section, the Secretary shall consider—

''(A) leveraging the resources of relevant existing Manufacturing USA institutes described in section 34(d) of the National Institute of Standards and Technology Act (15 U.S.C. 278s(d));

''(B) integrating program activities into a relevant existing Manufacturing USA institutes; or

''(C) establishing a new institute focused on low-emissions steel manufacturing.

''(2) OTHER FEDERAL AGENCIES.—In carrying out this section, the Secretary shall coordinate with other Federal agencies that are carrying out re-

search and development initiatives to increase industrial competitiveness and achieve significant net nonwater greenhouse emissions reductions through low-emissions steel manufacturing, including the Department of Defense, Department of Transportation, and the National Institute of Standards and Technology.''.

(b) CLERICAL AMENDMENT.—Section 1(b) of the Energy Independence and Security Act of 2007 (Public Law 110–140; 134 Stat. 2556; 121 Stat. 1494) is amended in the table of contents by inserting after the item relating to section 454 the following:

''Sec. 454A. Low-emissions steel manufacturing research program.''.

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