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REPORT
117–227

STEEL UPGRADING PARTNERSHIPS AND EMISSIONS REDUCTION ACT

JANUARY 18, 2022.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Ms. JOHNSON of Texas, from the Committee on Science, Space, and Technology, submitted the following

R E P O R T

[To accompany H.R. 4599]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science, Space, and Technology, to whom was referred the bill (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, having considered the same, reports favorably thereon with an amendment and recommends that the bill as amended do pass.

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29–006

I. AMENDMENT

The amendment is as follows:
Strike all after the enacting clause and insert the following:

SECTION 1. SHORT TITLE.

This Act may be cited as the "Steel Upgrading Partnerships and Emissions Reduction Act" or the "SUPER Act of 2021".

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 division Z of the Consolidated Appropriations Act, 2021 (Public Law 116–260).

"(3) CRITICAL MINERAL.—The term 'critical mineral' has the meaning given such term in section 7002 of division Z of the Consolidated Appropriations Act, 2021 (Public Law 116–260).

"(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, 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, 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 resources 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, 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 U.S.A..—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 Institute; 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 research 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 (42 U.S.C. 17001 note) 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.".

II. PURPOSE OF THE BILL

The purpose of the bill is to amend the Energy Independence and Security Act of 2007 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. H.R. 4599 is sponsored by Mr. Gonzalez and co-sponsored by Mr. Lamb, Mr. McKinley, Ms. Wild, Ms. Miller-Meeks, Mr. Mrvan, Mr. Delgado, and Mr. Rogers.

III. BACKGROUND AND NEED FOR THE LEGISLATION

While recent emphasis has been placed on reducing power sector greenhouse gas (GHG) emissions, the need to substantially reduce

GHGs in the industrial sector remains a challenge.[1] Steel and steelmaking practices are of particular importance to the industrial sector and play a fundamental role in supporting U.S. infrastructure, national defense, and economic security. The steel industry is also among the three largest global producers of carbon dioxide. In 2018, steel production alone was responsible for 8 percent of global carbon dioxide emissions.[2]

To address this challenge, there is a need for federal investment in next-generation steelmaking emission reduction technologies. The U.S. Department of Energy (DOE or the Department) supports the research and development of industrial emission reduction technologies primarily through its Office of Energy Efficiency and Renewable Energy and its Advanced Manufacturing Office.

In conjunction with the cross-cutting Industrial Emissions Reduction Technology Development Program established by the Energy Act of 2020 (Division Z of the Consolidated Appropriations Act, 2021), the Steel Upgrading Partnerships and Emissions Reduction Act, or the SUPER Act of 2021, provides DOE with specific program direction to ensure the development of advanced tools, technologies, and methods for low-emissions steel manufacturing using both advanced and commercially available steelmaking processes.

IV. Committee Hearings

Pursuant to clause 3(c)(6) of rule XIII of the Rules of the House of Representatives, the Committee designates the following hearings as having been used to develop or consider the legislation:

On March 26, 2019, the Honorable Haley Stevens presiding, the Research and Technology Subcommittee and the Energy Subcommittee of the Committee on Science, Space, and Technology held a joint hearing to examine ways to substantially lower greenhouse gas emissions in the manufacturing sector through both federal investment and public-private partnerships. This hearing examined the role of the Manufacturing USA Institutes in achieving this goal.

Witnesses

- Mr. Ryan Myers, Director of Business Development, DoD for Hexagon Manufacturing Intelligence (Hexagon MI)
- Mr. Mike Molnar, Director of the Office of Advanced Manufacturing, National Institute of Standards and Technology (NIST)
- Dr. John Hopkins, CEO of the Institute for Advanced Composites Manufacturing Innovation (IACMI)
- Ms. Valri Lightner, Acting Director of the Advanced Manufacturing Office, Office of Energy Efficiency and Renewable Energy, Department of Energy
- Dr. Mitchell Dibbs, Associate R&D Director for External Technology—Government Programs, Dow Chemical Company

On June 19, 2019, the Honorable Conor Lamb presiding, the Energy Subcommittee of the Committee on Science, Space, and Technology held a hearing to examine the Department of Energy's fossil

[1] https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks.
[2] https://www.mckinsey.com/industries/metals-and-mining/our-insights/decarbonization-challenge-for-steel.

energy research and development activities. This hearing included discussion of the Department's current work on developing technologies to help reduce emissions in industrial processes.

Witnesses

- Ms. Shannon Angielski, Executive Director, Carbon Utilization Research Council
- Mr. Elgie Holstein, Senior Director for Strategic Planning, Environmental Defense Fund
- Mr. Jeff Bobeck, Director of Energy Policy Engagement, Center for Climate and Energy Solutions
- Ms. Erin Burns, Director of Policy, Carbon180
- Dr. Erik K. Webb, Senior Manager, Geoscience Research and Applications, Sandia National Laboratories

V. Committee Consideration and Votes

The Committee on Science, Space, and Technology met to consider H.R. 4599 on July 27, 2021.

Mr. Gonzalez offered a manager's amendment to make technical corrections and conforming changes. *The amendment was agreed to by a voice vote.*

Chairwoman Johnson moved that the Committee favorably report the bill, H.R. 4599, as amended, to the House of Representatives with the recommendation that the bill be approved. *The motion was agreed to by a voice vote.*

VI. Summary of Major Provisions of the Bill

The Steel Upgrading Partnerships and Emissions Reduction Act" or the "SUPER Act of 2021" (H.R. 4599) directs the Secretary of Energy (the Secretary) to establish a program of research, development, demonstration, and commercial application of advanced tools, technologies, and methods for low-emissions steel manufacturing in order to increase the competitiveness of U.S. industry and achieve significant reductions in emissions from both advanced and commercially available steelmaking processes.

H.R. 4599 directs the Secretary, in carrying out this program, to focus on a range of key technology areas, including heat generation, carbon capture, smart manufacturing, resource efficiency, alternative materials, and high performance computing, and to leverage the research infrastructure of the Department as practicable. It requires the Secretary to carry out this work in coordination with relevant programs of the Department, other federal agencies including NIST, and with relevant programs and activities authorized in the Energy Act of 2020.

VII. Section-by-Section Analysis (By Title and Section)

Sec. 1. Short title

Section 1 establishes that this legislation may be referred to as the "Steel Upgrading Partnerships and Emissions Reduction Act" or the "SUPER Act of 2021"

Sec. 2. Low-Emissions Steel Manufacturing Research Program

This section authorizes a DOE research, development, demonstration, and commercial application program of advanced tools,

technologies, and methods for low-emissions steel manufacturing, in order to increase the technological and economic competitiveness of industry and manufacturing in the United States and achieve significant greenhouse gas emissions reductions in the production processes for iron, steel, and steel mill products. The program focuses on several key technology areas, including heat generation, carbon capture, smart manufacturing, resource efficiency, alternative materials, and high performance computing.

This section directs the Secretary to coordinate this program with the programs and activities authorized in title VI of division Z of the Consolidated Appropriations Act, 2021; to coordinate with relevant federal agencies and 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 Nuclear Energy; to leverage the research infrastructure of the Department as practicable; to conduct activities that have the potential to increase domestic production and employment in advanced and commercially available steelmaking; to support the development of standardized testing and validation practices in consultation with NIST; and to develop a 5-year strategic plan identifying research, development, demonstration, and commercial application goals for the program and provide updates to this plan every two years.

This section also directs the Secretary to support an initiative for the demonstration of low-emissions steel manufacturing in collaboration with industry partners, institutions of higher education, and the National Laboratories, and to consider leveraging the resources of the Manufacturing USA Institutes.

Subsection (b) amends the table of contents in the Energy Independence and Security Act of 2007 by inserting the Low-Emissions Steel Manufacturing Research Program.

VIII. Committee Views

The Committee intends that the research, development, demonstration, and commercial application program authorized in this legislation be cross-cutting in nature, involving all relevant program offices at the Department of Energy. The Committee also intends for the research, development, demonstration, and commercial application program authorized in this legislation to build from existing activities at the Department and make use of the Department's unique computing capabilities and user facilities.

IX. Cost Estimate

Pursuant to clause 3(c)(2) of rule XIII of the Rules of the House of Representatives, the Committee adopts as its own the estimate of new budget authority, entitlement authority, or tax expenditures or revenues contained in the cost estimate prepared by the Director of the Congressional Budget Office pursuant to section 402 of the Congressional Budget Act of 1974.

X. CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

U.S. CONGRESS,
CONGRESSIONAL BUDGET OFFICE,
Washington, DC, January 11, 2022.

Hon. EDDIE BERNICE JOHNSON,
Chairwoman, Committee on Science, Space, and Technology,
House of Representatives, Washington, DC.

DEAR MADAM CHAIRWOMAN: The Congressional Budget Office has prepared the enclosed cost estimate for H.R. 4599, the SUPER Act of 2021.

If you wish further details on this estimate, we will be pleased to provide them. The CBO staff contact is Aaron Krupkin.

Sincerely,

MARK P. HOELLER,
(For Phillip L. Swagel, Director).

Enclosure.

H.R. 4599, SUPER Act of 2021
As ordered reported by the House Committee on Science, Space, and Technology on July 27, 2021

By Fiscal Year, Millions of Dollars	2022	2022-2026	2022-2031
Direct Spending (Outlays)	0	0	0
Revenues	0	0	0
Increase or Decrease (-) in the Deficit	0	0	0
Spending Subject to Appropriation (Outlays)	*	*	not estimated

Statutory pay-as-you-go procedures apply?	No	Mandate Effects	
Increases on-budget deficits in any of the four consecutive 10-year periods beginning in 2032?	No	Contains intergovernmental mandate?	No
		Contains private-sector mandate?	No

* = between zero and $500,000.

H.R. 4599 would require the Department of Energy (DOE), in coordination with other federal agencies, to establish a program to encourage the development of technologies that reduce greenhouse gas emissions in steel manufacturing. Under the program, DOE would develop strategic plans, support testing and validation activities, sponsor demonstration projects, and report to the Congress on program implementation.

Under current law, DOE's general authorities allow for the activities specified in the bill, and according to the agency, the bill's requirements are consistent with its current research and development plans. On that basis, CBO estimates that the cost to implement H.R. 4599, including any additional reporting requirements, would not be significant over the 2022–2026 period. Any spending would be subject to the availability of appropriated funds.

The CBO staff contact for this estimate is Aaron Krupkin. The estimate was reviewed by H. Samuel Papenfuss, Deputy Director of Budget Analysis.

XI. Federal Mandates Statement

H.R. 4599 contains no unfunded mandates.

XII. Committee Oversight Findings and Recommendations

The Committee's oversight findings and recommendations are reflected in the body of this report.

XIII. Statement on General Performance Goals and Objectives

Pursuant to clause (3)(c) of rule XIII of the Rules of the House of Representatives, the goals of H.R. 4599 are to strengthen and enhance the competitiveness of American manufacturing through the research and development of advanced technologies to reduce steelmaking emission.

XIV. Federal Advisory Committee Statement

No Federal Advisory Committees are created by H.R. 4599.

XV. Duplication of Federal Programs

Pursuant to clause 3(c)(5) of rule XIII of the Rules of the House of Representatives, the Committee finds that no provision of H.R. 4599 establishes or reauthorizes a program of the federal government known to be duplicative of another federal program, including any program that was included in a report to Congress pursuant to section 21 of Public Law 111–139 or the most recent Catalog of Federal Domestic Assistance.

XVI. Earmark Identification

Pursuant to clauses 9(e), 9(f), and 9(g) of rule XXI, the Committee finds that H.R. 4599 contains no earmarks, limited tax benefits, or limited tariff benefits.

XVII. Applicability to the Legislative Branch

The Committee finds that H.R. 4599 does not relate to the terms and conditions of employment or access to public services or accommodations within the meaning of section 102(b)(3) of the Congressional Accountability Act (Public Law 104–1).

XVIII. Statement on Preemption of State, Local, or Tribal Law

This bill is not intended to preempt any state, local, or tribal law.

XIX. Changes in Existing Law Made by the Bill, as Reported

In compliance with clause 3(e) of rule XIII of the Rules of the House of Representatives, changes in existing law made by the bill, as reported, are shown as follows (new matter is printed in italics and existing law in which no change is proposed is shown in roman):

ENERGY INDEPENDENCE AND SECURITY ACT OF 2007

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) SHORT TITLE.—This Act may be cited as the "Energy Independence and Security Act of 2007".

(b) TABLE OF CONTENTS.—The table of contents of this Act is as follows:

Sec. 1. Short title; table of contents.

* * * * * * *

TITLE IV—ENERGY SAVINGS IN BUILDINGS AND INDUSTRY

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Subtitle D—Industrial Energy Efficiency

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

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TITLE IV—ENERGY SAVINGS IN BUILDINGS AND INDUSTRY

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Subtitle D—Industrial Energy Efficiency

* * * * * * *

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 division Z of the Consolidated Appropriations Act, 2021 (Public Law 116–260).

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

(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, 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, 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 resources 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, 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 U.S.A.—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 Institute; 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 research 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.

* * * * * * *

XX. PROCEEDINGS OF THE FULL COMMITTEE MARKUP

MARKUPS: H.R. 4609, THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY FOR THE FUTURE ACT OF 2021; H.R. 3858, THE NATIONAL SCIENCE AND TECHNOLOGY STRATEGY ACT OF 2021; H.R. 4588; THE REGIONAL INNOVATION ACT OF 2021; H.R. 4606, THE ENERGIZING TECHNOLOGY TRANSFER ACT, AND H.R. 4599, THE STEEL UPGRADING PARTNERSHIPS AND EMISSIONS REDUCTION ACT OR SUPER ACT OF 2021

MARKUP

BEFORE THE

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY HOUSE OF REPRESENTATIVES

ONE HUNDRED SEVENTEENTH CONGRESS

FIRST SESSION

JULY 27, 2021

Serial No. CP: 117–7

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Tuesday, July 27, 2021

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H.R. 4599, THE STEEL UPGRADING PARTNERSHIPS AND EMISSIONS REDUCTION ACT OR SUPER ACT OF 2021

TUESDAY, JULY 27, 2021

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,
Washington, D.C.

The Committee met, pursuant to notice, at 10:01 a.m., in room 2318 of the Rayburn House Office Building, Hon. Eddie Bernice Johnson [Chairwoman of the Committee] presiding.

Chairwoman JOHNSON. Good morning. The Committee will come to order, and, without objection, the Chair is authorized to declare recess at any time. Pursuant to Committee Rules and House Rule 11, the Chair now set—to postpone roll call votes at any time. Today the Committee is meeting virtually and in person. I want to announce a couple of reminders to the Members about the conduct of the meeting. First, Members attending remotely should keep their video feed on as long as they're present in the meeting, and Members are responsible for their own microphones. Please also keep your microphones muted until you are speaking. And, finally, if Members have documents they wish to submit to the record, please e-mail them to the Committee Clerk, whose e-mail address was circulated prior to the meeting. Pursuant to notice, the Com-

mittee meets to consider the following measures. H.R. 4609, the *National Institute of Standards and Technology for the Future Act of 2021*, H.R. 3858, the *National Science and Technology Strategy Act of 2021*, H.R. 4588, the *Regional Innovation Act of 2021*, and H.R. 4606, the *Emerging Technology Transfer Act*, and finally, H.R. 4599, the *Steel Upgrading Partnerships and Emissions Reduction Act*, or *SUPER Act, of 2021*.

Good morning, and welcome to today's markup of five excellent bipartisan bills. All of these bills will help to ensure that our Nation remains a leader in innovation. Importantly, these bills also help to ensure that the whole Nation participates in the innovation economy, and that the whole Nation reaps the economic fruits of that participation. The first bill we will take up today is Representative Stevens and Waltz's *National Institute of Standards and Technology for the Future Act,* and I'm proud to co-sponsor this bill, and I want to thank my colleagues on both sides of the aisle for their thoughtful engagement and enthusiastic support for this critical agency.

The *NIST for the Future Act* is a comprehensive 5 year reauthorization for the agency. These accounts fund important measures, measurements, and technology research, as well as NIST's (National Institute of Standards and Technology's) instrumental manufacturing programs. The bill would also support NIST's infrastructure needs at a time when many of its buildings are in poor to critical condition. In total, the legislation authorizes $7.9 billion over 5 years, allowing for growth that is both ambitious and sustainable. These investments are necessary to support a critical Federal agency charged with helping to advance U.S. competitiveness and innovation.

The next bill that we will consider is H.R. 3858, the *National Science and Technology Strategy Act of 2021.* I want to thank Representative Waltz and Ross for their work on this legislation. This bill directs the White House Office of Science and Technology Policy, or OSTP, to undertake a comprehensive review of the Nation's innovation landscape. The bill also directs OSTP to use this analysis to develop a national science and technology strategy.

The next bill that we will be considering is H.R. 4588, the *Regional Innovation Act of 2021.* I want to thank my colleagues, Representative Wild and Baird, for their important work on this legislation. Over the last 2 decades, much of the science and technology funding and capacity in this country has been concentrated in a few cities and regions. This bill would establish programs at both the Commerce and Energy Departments to address this imbalance. It would create more shared prosperity from our Federal R&D (research and development) dollars by creating regional technology and innovation hubs across the country.

And next we will consider H.R. 4606, the *Emerging Technology Transfer Act.* This bill is an updated version of a bipartisan bill that I and Representative Fleischmann introduced last year. It authorizes programs and funding to support the Department of Energy (DOE) technology transfer activities. These activities are critical to bringing the fruits of our public investment in clean energy research, development, and demonstration projects into the hands of America's communities. The bill also includes provisions to sup-

port the next generation of innovators, inventors, and entrepreneurs, and I want to thank Congresswoman Ross and Congressman Meijer for leading this important piece of legislation.

The last bill on the roster today is the *Steel Upgrading Partnerships and Emissions Reduction Act*, which is sponsored by Representative Gonzalez and Representative Lamb. This bill authorizes a program at the Department of Energy to advance technologies that will help reduce emissions from the steel manufacturing sector, allowing American steel manufacturers access to advanced and innovative technologies will ensure that the domestic steel manufacturing industry will remain competitive through the 21st century.

I look forward to a productive markup today, and I now recognize our Ranking Member, Mr. Lucas, for his opening remarks.

[The prepared statement of Chairwoman Johnson follows:]

Good morning, and welcome to today's markup of 5 excellent bipartisan bills. All of these bills will help to ensure that our Nation remains a leader in innovation. Importantly, these bills also help to ensure that the whole Nation participates in that innovation economy, and that the whole Nation reaps the economic fruits of that participation.

The first bill we will take up today is Representatives Stevens' and Waltz's *National Institute of Standards and Technology for the Future Act*. I am proud to cosponsor this bill, and I want to thank my colleagues on both sides of the aisle for their thoughtful engagement and enthusiastic support for this critical agency. The *NIST for the Future Act* is a comprehensive 5 year reauthorization for the agency.

These accounts fund important measurement and technology research, as well as NIST's extramural manufacturing programs. The bill would also support NIST's infrastructure needs at a time when many of its buildings are in poor to critical condition. In total, the legislation authorizes $7.9 billion over 5 years, allowing for growth that is both ambitious and sustainable. These investments are necessary to support a critical federal agency charged with helping to advance U.S. competitiveness and innovation.

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The last bill on the roster today is the *Steel Upgrading Partnerships and Emissions Reduction Act* which is sponsored by Representative Gonzalez and Representative Lamb. This bill authorizes a program at the Department of Energy to advance technologies that will help reduce emissions from the steel manufacturing sector.

Allowing American steel manufacturers access to advanced and innovative technologies will ensure that the domestic steel manufacturing industry will remain competitive through the 21st Century.

I look forward to a productive markup today.

Mr. LUCAS. Thank you, Chairwoman Johnson, for holding today's markup. The bills we're considering today are a continuation of the important and bipartisan work we've been doing on American scientific competitiveness. Last month the House overwhelmingly passed our legislation to redouble our investments in the National Science Foundation and the Department of Energy Office of Science. These bills are the cornerstones of our blueprint to buildup America's research and technology enterprise. Today we're filling out the blueprint with the rest of the elements needed to shore up the Nation's technological success. First among those is reauthorizing the National Institute of Standard and Technology.

NIST is the most important government agency that most Americans have never heard of. As industry's laboratory, NIST's work to promote U.S. innovation supports roughly half of our gross domestic product. NIST gives businesses the measurement science, standards, and guidance they need to produce exceptional products that can be globally competitive. The *NIST for the Future Act* invests in the emerging technologies needed to drive progress, including cybersecurity, quantum sciences, artificial intelligence (AI), and advanced manufacturing. It also prioritizes scientific and technical research services, expands our support for American manufacturers, and upgrades outdated NIST facilities. Finally, it prioritizes our participation and leadership in international standard-setting bodies. As new technologies grow and spread, it's critical that we are able to influence the standards and specifications that guide their development. This investment in NIST will go far to support American competitiveness, and expand the resources available to American businesses. I want to thank Chairwoman Johnson, Chairwoman Stevens, and Ranking Member Walsh for working with me on this important bill.

Next we'll consider the *National Science and Technology Strategic Act* by Representative Waltz. This bill creates a strategic whole of government approach to research and development, ensuring better coordination between Federal agencies, and a more strategic plan for achieving U.S. research and development goals. Additionally, the bill requires the President to submit an annual report to Congress on national research priorities and activities, as well as global trends in science and technology, including potential threats to U.S. scientific leadership. A competitive, strategic approach to American research and development is more important now than ever, especially as we pass legislation to increase our investments in our Federal scientific enterprise. This bill ensures we are regularly reviewing and updating our research priorities so we're maximizing taxpayer dollars, and investing in the most critical areas of technological advancement.

Following that, we'll debate H.R. 4588, the *Regional Innovation Act*. This bill establishes innovation hubs across the country, ensuring technological development isn't limited solely to the coasts. I talk a lot about the value of taking advantage of talent across America, and giving diverse communities a chance to contribute to

important scientific work. This bill guarantees that we build out our technological capacity as we are driving innovation in geographically diverse areas, with at least 1/3 of the newly created regional innovation hubs in rural or underserved areas.

Next up is H.R. 4606, the *Energizing Technology Transfer Act*. This legislation is an important complement to the *DOE Science for the Future Act* because it helps turn the discoveries we make from basic research into useful technologies that private—the private sector can commercialize. Finally, we'll consider H.R. 4599, the *Steel Upgrading Partnerships and Emissions Reduction Act*, or the *SUPER Act*, for short. This bill is from Representatives Anthony Gonzalez and Conor Lamb, will support R&D into clean steel production use. This will help reduce carbon emissions, while supporting American manufacturing and production.

Together, these five bills address key components of American competitiveness. They were all developed with extensive stakeholder input through a bipartisan process. They're all intended to catalyze our scientific growth. The threat we face from China is real, and growing every day. It threatens American jobs, cybersecurity, and national security. But our plan to ensure our competitiveness is not about top-down planning, like the Communist Chinese Party (CCP). It's about coordinating our own strengths, bringing together all Federal agencies, and all sectors of the U.S. innovation economy together, to coordinate and ensure that the oxen are pulling the cart in the same direction.

The bills we're considering today, along with the *NSF for the Future Act*, and *DOE Science for the Future Act*, represent a thoughtful vision for American science and technology development that is strategic, comprehensive, and, importantly, workable. I'm very proud of the work this Committee and our staff has done, and I'd like to thank all my colleagues, particularly Chairwoman Johnson, for the work that went into these bills. I'm eager to mark them up today and pass them out of Committee. I believe we have a strong starting point for a competitive legislative package on American competitiveness, and I look forward to finalizing our policies into law. And with that, I yield back, Madam Chair.

[The prepared statement of Mr. Lucas follows:]

Thank you, Chairwoman Johnson, for holding today's markup. The bills we're considering today are a continuation of the important and bipartisan work we've been doing on American scientific competitiveness.

Last month, the House overwhelmingly passed our legislation to redouble our investment in the National Science Foundation and the Department of Energy Office of Science. These bills are the cornerstones of our blueprint to build up America's research and technology enterprise. Today we're filling out that blueprint with the rest of the elements needed to shore up our nation's technological success. First among those is reauthorizing the National Institute of Standards and Technology (NIST).

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are able to influence the standards and specifications that guide their development. This investment in NIST will go far to support American competitiveness and expand the resources available to American businesses. I want to thank Chairwoman Johnson, Chairwoman Stevens, and Ranking Member Waltz for working with me on this important bill.

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Following that, we'll debate H.R. 4588, the *Regional Innovation Act*. This bill establishes innovation hubs across the country, ensuring technological development isn't limited solely to the coasts. I talk a lot about the value of taking advantage of talent across America and giving diverse communities a chance to contribute to important scientific work. This bill guarantees that as we build out our technical capacity, we are driving innovation in geographically diverse areas, with at least one-third of the newly created regional innovation hubs in rural or under-served areas.

Next up is H.R. 4606, the *Energizing Technology Transfer Act*. This legislation is an important complement to the *DOE Science for the Future Act* because it helps turn the discoveries we make from basic research into useful technologies that the private sector can commercialize.

Finally, we'll consider H.R. 4599, the *Steel Upgrading Partnerships and Emissions Reduction Act*, or the SUPER Act for short. This bill, from Representatives Anthony Gonzalez and Conor Lamb, will support R&D into clean steel production and use. This will help reduce carbon emissions while supporting American manufacturing and production.

Together, these five bills address key components of American competitiveness. They were all developed with extensive stakeholder input through a bipartisan process, and they're all intended to catalyze our scientific growth.

The threat we face from China is real and growing every day. It threatens American jobs, cybersecurity, and national security. But our plan to ensure our competitiveness is not about top-down planning, like the Chinese Community Party. It's about coordinating our own strengths—bringing together all federal agencies, and all sectors of the U.S. innovation economy together to coordinate and ensure the oxen are pulling the cart in the same direction. The bills we are considering today, along with the *NSF for the Future Act* and *DOE Science for the Future Act*, represent a thoughtful vision for American science and technology development that is strategic, comprehensive, and—importantly—workable.

I'm very proud of the work this Committee and our staff have done. I'd like to thank all of my colleagues—particularly Chairwoman Johnson—for the work that went into these bills. I'm eager to mark them up today and pass them out of Committee. I believe we have a strong starting point for a comprehensive legislative package on American competitiveness, and I look forward to finalizing our policies into law.

We now will consider H.R. 4599, the *Steel Upgrading Partnerships and Emissions Reduction Act*. The Clerk will report the bill.

The CLERK. H.R. 4599, 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.

[The bill follows:]

.....

(Original Signature of Member)

117TH CONGRESS
1ST SESSION

H. R. _____

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.

IN THE HOUSE OF REPRESENTATIVES

Mr. Gonzalez of Ohio introduced the following bill; which was referred to the Committee on _____

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" or the "SUPER Act of 2021".

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 division Z of the Consolidated Appropriations Act, 2021 (Public Law 116–260).

"(3) CRITICAL MINERAL.—The term 'critical mineral' has the meaning given such term in section 7002 of division Z of the Consolidated Appropriations Act, 2021 (Public Law 116–260).

"(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, 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 do-

mestic 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, the Secretary shall develop a 5-year strategic plan identifying research, development, demonstration, and commercial application goals for the program in accordance with this section. 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 for carbon dioxide removal;

"(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 resources 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 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.—Beginning on the date of enactment of the Steel Upgrading Partnerships and Emissions Reduction Act, the Secretary, 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.—In selecting eligible entities for the demonstration projects under this subsection, the Secretary shall, 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 program under this subsection, a report describing the performance of the program; and

"(B) if the program 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 program.

"(i) ADDITIONAL COORDINATION.—

"(1) MANUFACTURING U.S.A..—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 Institute; 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 research and development initiatives to increase industrial competitiveness and achieve significant net nonwater greenhouse emissions reductions through low-emissions steel manufacturing, including the De-

partment 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 (42 U.S.C. 17001 note) 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.".

Chairwoman JOHNSON. Without objection, the bill is considered as read, and open to amendment at any point. Anyone wish to be recognized to speak on this bill?

Mr. GONZALEZ. Madam Chair, the gentleman from Ohio, Mr. Gonzalez.

Chairwoman JOHNSON. Mr. Gonzalez.

Mr. GONZALEZ. Thank you, Chairwoman Johnson, and Ranking Member Lucas, for holding this markup today. I urge all my colleagues to support my legislation, the *Steel Upgrading Partnerships and Emissions Reduction Act*, or *SUPER Act*. I'm not smart enough to come up with that acronym, so whoever did, thank you. I was proud to introduce this legislation alongside my friend Mr. Lamb, and thank him for his leadership on this issue. Also I want to thank the majority and minority staff for working with my team, and also stakeholders, including Clear Path Foundation and the American Iron and Steel Institute for their support of this legislation. The *SUPER Act* directs the Department of Energy to establish a program that will further the research, development demonstration, and commercial application of breakthrough tools, technologies, and emissions for low emissions steel manufacturing to increase the competitiveness of U.S. industry, and reduce emissions from both advanced and commercially available steelmaking processes.

As we all know, a strong domestic steel industry is critical to our Nation's infrastructure, national defense, and economy. While steel produced here in the U.S. is already among the cleanest in the world, our steel industry is under increased pressure to meet emissions reduction goals demanded by consumers and investors, and remain competitive in foreign markets as countries weigh domestic subsidies and carbon border adjustments. The reality is that reducing emissions in the steel manufacturing process is vital to maintaining U.S. competitiveness, and ensuring the nearly two million American jobs supported by the U.S. steel industry are protected. In order to ensure American leadership in steel manufacturing, we need to accelerate the development of advanced breakthrough technologies. The *SUPER Act* aims to do just that by stimulating more research on a range of key areas, including heat generation, carbon capture, smart manufacturing, resource efficiency, alternative materials, and high-performance computing.

Finally, developing breakthrough technologies and bringing them to market will require an all hands on deck approach. To ensure greater public and private coordination, the bill directs the Secretary to coordinate with relevant programs or offices at the Department, other Federal agencies, such as NIST, and the network at Manufacturing USA. It also supports a demonstration initiative in collaboration with industry, universities, and DOE National Labs. As I've said before at this Committee, if we want to lead the way in reducing emissions while remaining the world's economic powerhouse, American innovation must be front and center in that debate. The *SUPER Act* does exactly that, and is the right approach.

Finally, Madam Chair, I ask unanimous consent to include in the record letters of support from both the American Iron and Steel In-

stitute, Clear Path Foundation, Citizens for Responsible Energy Solutions, and the Niskanen Center.

Chairwoman JOHNSON. Without objection.

[The information referred to follows:]

American Iron and Steel Institute

25 Massachusetts Avenue, NW
Suite 800
Washington, DC 20001
Phone 202.452.7118
Fax 202.452.1039
E-mail kdempsey@steel.org

www.steel.org

Kevin M. Dempsey
President and Chief Executive Officer

July 21, 2021

The Honorable Anthony Gonzalez
U.S. House of Representatives
2458 Rayburn House Office Building
Washington, DC 20515

The Honorable Conor Lamb
U.S. House of Representatives
1224 Longworth House Office Building
Washington, DC 20515

Dear Representatives Gonzalez and Lamb,

On behalf of the producer member companies of the American Iron and Steel Institute (AISI), I am writing to express our support for the "Steel Upgrading Partnerships and Emissions Reduction Act" or the "SUPER Act of 2021." AISI's membership is comprised of integrated and electric arc furnace steelmakers, and associate members who are suppliers to or customers of the steel industry.

As you know, the American industry is the cleanest and most energy efficient of the leading steel industries in the world. Of the seven largest steel producing countries, the U.S. has the lowest CO_2 emissions per ton of steel produced and the lowest energy intensity. Steel producers in the U.S. are undertaking significant efforts to further reduce our greenhouse gas (GHG) emissions and consumption of energy. These commitments include advancements in domestic production using direct reduced iron (DRI) and hot briquetted iron (HBI), increased use of renewable electricity and research to assess the use of carbon capture technology and hydrogen in the steelmaking process.

We understand that the focus of the SUPER Act is the Department of Energy's coordination of research and development efforts related to future breakthrough technologies that will facilitate further reductions in emissions by steel producers in the United States. AISI supports these goals. Focusing Federal efforts on research and development into breakthrough technologies, rather than funding investments into existing technologies that are already deployed by the private sector, is an important and appropriate role for government in our view.

Again, we appreciate your work on this legislation and support for the domestic steel industry. We look forward to working with you as the bill moves through the legislative process.

Sincerely,

Kevin M. Dempsey
President and Chief Executive Officer
American Iron and Steel Institute

CLEARPATH ACTION

July 21, 2021

The Honorable Anthony Gonzalez
2458 Rayburn House Office Building
United States House of Representatives
Washington, D.C. 20515

The Honorable Conor Lamb
1224 LongworthHouse Office Building
United States House of Representatives
Washington, D.C. 20515

Representatives Gonzalez and Lamb:

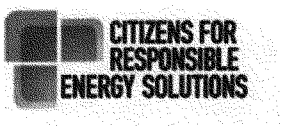
On behalf of ClearPath Action, a 501(c)(4) organization working to advance federal policies that accelerate clean energy and industrial innovation, I am writing to heartily support the concepts contained in your *Steel Upgrading Partnerships and Emissions Reduction Act*.

Your proposed legislation would establish a meaningful and technology inclusive steel decarbonization research and development strategy for the first time in modern U.S. history. It provides critical support to potential breakthrough technologies, from hydrogen-based steelmaking to carbon capture and new innovative manufacturing methods. These types of emerging technologies have the potential to complement current clean production routes and increase U.S. competitiveness of clean steel manufacturing. The proposal would also bolster the initial deployment of these new technologies through utilization of manufacturing institutes, a critical piece in ensuring successful scale-up.

We look forward to working with you to advance the *Steel Upgrading Partnerships and Emissions Reduction Act*. Thank you for your bipartisan cooperation and commitment to advancing industrial innovation and clean energy.

Sincerely,

Rich Powell
Executive Director, ClearPath Action



July 22, 2021

"Industrial manufacturing is incredibly energy-intensive and difficult to de-carbonize. As the world wakes up to the cost and impact of producing materials such as steel and iron, where and how those materials are produced becomes critical. America has led the world in reducing emissions, but our low-hanging fruit is quickly diminishing. That is why CRES applauds Representatives Anthony Gonzalez and Conor Lamb for their bipartisan leadership on the *Steel Upgrading Partnerships and Emissions Reduction (SUPER) Act*, which will help continue to shrink our emissions—not our economy—and export American goods and technology—not American jobs. The SUPER Act is an R&D investment in American innovation that will fight climate change and help make our iron and steel not only the best quality, but the most carbon-competitive in the world." – Heather Reams, Executive Director Citizens for Responsible Energy Solutions

NISKANEN
CENTER

July 26, 2021

Chairwoman Eddie Bernice Johnson
2306 Rayburn House Office Building
Washington, D.C., 20510

Ranking Member Frank Lucas
2405 Rayburn House Office Building
Washington, D.C., 20510

Chairwoman Johnson and Ranking Member Lucas,

The Niskanen Center applauds the House Committee on Science, Space, & Technology for its scheduled markup of the Steel Upgrading Partnership and Emissions Reduction (SUPER) Act (H.R. 4495). As co-sponsors of the SUPER Act, Representatives Gonzalez and Lamb have demonstrated a commitment to climate action and to bipartisanship.

The SUPER Act directs federal funding and resources into the development of cutting-edge technologies that will play a crucial role in supporting low-carbon steel manufacturing in the U.S. These technology areas closely align with effective decarbonization strategies for the steel industry identified by the Niskanen Center and decarbonization of the steel sector is a vital step on the path to achieving net-zero greenhouse gas (GHG) emissions. As the U.S. economy continues to transition toward a clean energy future, it is essential that steel manufacturers possess the tools and technologies to remain internationally competitive while cutting GHG emissions.

We look forward to the markup and to supporting the Committee's future energy and environmental work.

Respectfully,

Kodiak Hill-Davis
Vice President of Government Affairs
Niskanen Center

Corey Schrodt
Legislative Affairs Manager, Climate
Niskanen Center

Mr. GONZALEZ. With that, Madam Chair, I urge my colleagues to support H.R. 4599, and I yield back.

Chairwoman JOHNSON. Thank you. Any further requests for time? Mr.——

Mr. CASTEN. Madam—move to strike the last word.

Chairwoman JOHNSON. The Member is recognized for——

Mr. CASTEN. I want to thank Mr. Gonzalez and Mr. Lamb for this bill. I—you know, as you all know, I spend most of my time here talking about climate. What you may not know is I spent a lot of my prior career in the steel industry because we were chasing projects to recover waste heat off steel mills. And if you have never been in an integrated steel mill in the United States, you don't fully understand the scope of what is possible in American manufacturing, going through a blast furnace, spending some time at the largest coke oven battery in North America, I believe in the world, the SunCoke facility in northern Indiana, they have remarkable operations.

When I introduced my *Clean Industrial Technology Act* last year, it was in no small part because it frustrates me that my friends to the political left will put up their hand their hand and say I pledge to reduce emissions to zero by—pick a year. And if you don't know how to make steel without metallurgical coke, that's like saying I'm going to eliminate the deficit without touching tax policy. You have to figure out how to do that, and I'm glad that that bill was approved, was signed into the law the by prior President. We're now trying to get it appropriated. And a part of the opportunity that I think this bill captures is to make sure that we continue to develop those technologies so that our steelmaking can be clean and efficient.

The other part that I hope we'll also do, and I hope we can work with Mr. Gonzalez and Mr. Lamb on this going forward, is that the—like any capital intensive, low-margin business, the steel industry more often than not does not deploy completely proven technologies that can save them money because they just don't have access to the capital. And I think the—there is a huge R&D challenge here that this bill address. It's an RD&D (research, development, and demonstration) challenge, and I look forward to working my colleagues going forward on other opportunities to deploy the technologies that are already out there. But I thank you for this bill, support—encourage my colleagues to support it, and I yield back.

Chairwoman JOHNSON. Thank you very much. Any requests for further time? OK. We will then proceed with amendments in the order on the roster. The only amendment on the roster is a manager's amendment offered by the gentleman from Ohio, and he's recognized to offer that amendment.

Mr. GONZALEZ. I have an amendment at the desk.

Chairwoman JOHNSON. The Clerk will report the amendment.

The CLERK. Amendment No. 1, amendment to H.R. 4599, offered by Mr. Gonzalez of Ohio.

[The amendment of Mr. Gonzalez follows:]

AMENDMENT TO H.R. 4599

OFFERED BY MR. GONZALEZ OF OHIO

Page 5, beginning on line 9, strike "in accordance with this section" and replace with "established in subsection (c)".

Page 7, beginning on line 3, strike "for carbon dioxide removal" and insert "to reduce carbon dioxide emissions".

Page 9, line 8, insert "the Director of" before "the National Institute of Standards and Technology".

Page 9, line 15, strike "Beginning on the date of enactment of" and replace with "Not later than 180 days after the enactment of".

Page 9, line 17, insert "in carrying out the program established in subsection (c), and" after "Secretary,".

Page 10, strike lines 1 through 4 and insert the following:

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

Page 10, line 23, strike "program" and replace with "initiative".

Page 10, line 24, strike "program" and replace with "initiative".

Page 11, line 1, strike "program" and replace with "initiative".

Page 11, line 5, strike "program" and replace with "initiative".

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Chairwoman JOHNSON. I ask unanimous consent to dispense with the reading. Without objection, so ordered. I recognize the gentleman for 5 minutes to explain his amendment.

Mr. GONZALEZ. Thank you, Chairwoman Johnson. This is a simple amendment, provides technical changes to this legislation, and incorporates feedback from the American Iron and Steel Institute. Again, I want to thank my friend Congressman Lamb. I want to thank Congressman Casten for his remarks, and their staffs, and Congressman Lamb's staff, for working with me to incorporate these important changes. I encourage my colleagues to support this amendment, and I yield back the balance of my time.

Chairwoman JOHNSON. Thank you very much. Any further discussion? The vote then occurs on the amendment. All those in favor say aye. Those opposed—OK. Those opposed no. The ayes have it, and the amendment is agreed to.

If there's no further amendments, a reporting quorum being present, I move that the Committee on Science, Space, and Technology report H.R. 4599, as amended, to the House, with the recommendation that the bill will be approved. Those in favor of the motion will signify by saying aye. Those opposed no. The ayes have it, and the bill is reported favorably.

Without objection, a motion to reconsider is laid on the table, and I ask unanimous consent that staff be authorized to make any necessary technical and conforming changes to the bill. Without objection, so ordered. Members will have two subsequent calendar days in which to submit supplementary minority or additional views to this measure. I want to thank all the Members for being present and helping us to get through this bipartisan bill discussion and passing from the Committee. Thanks to all of you for your efforts. And this concludes our markup, and the Committee is adjourned.

[Whereupon, at 12:20 p.m., the Committee was adjourned.]

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