

119TH CONGRESS
2D SESSION

S. 5220

To amend the Infrastructure Investment and Jobs Act to reauthorize the battery processing and manufacturing program, and for other purposes.

IN THE SENATE OF THE UNITED STATES

AUGUST 3, 2026

Ms. CORTEZ MASTO (for herself, Mr. PADILLA, Mr. VAN HOLLEN, Mr. BENNET, and Ms. ROSEN) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

A BILL

To amend the Infrastructure Investment and Jobs Act to reauthorize the battery processing and manufacturing program, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Clean Transportation
5 Jobs and Development Act of 2026”.

6 **SEC. 2. DEFINITIONS.**

7 In this Act:

8 (1) **ALTERNATIVE FUEL.**—The term “alter-
9 native fuel” means a fuel that results in a signifi-

1 cant reduction in lifecycle greenhouse gas and cri-
 2 teria air pollutant emissions compared to conven-
 3 tional fuel options.

4 (2) DEPARTMENT.—The term “Department”
 5 means the Department of Energy.

6 (3) SECRETARY.—The term “Secretary” means
 7 the Secretary of Energy.

8 **SEC. 3. BATTERY PROCESSING AND MANUFACTURING.**

9 Section 40207 of the Infrastructure Investment and
 10 Jobs Act (42 U.S.C. 18741) is amended—

11 (1) in subsection (b)—

12 (A) in paragraph (3)—

13 (i) in subparagraph (A)—

14 (I) in clause (ii), by striking
 15 “and” at the end;

16 (II) in clause (iii), by striking the
 17 period at the end and inserting “;
 18 and”; and

19 (III) by adding at the end the
 20 following:

21 “(iv) to invest in 1 or more workforce
 22 training or education consortia that sup-
 23 port the battery, battery manufacturing, or
 24 critical mineral operations of local proc-
 25 essing facilities, including eligible consortia

described in section 28(c) of the Steven-
 son-Wydler Technology Innovation Act of
 1980 (15 U.S.C. 3722a(c)) and regional
 innovation engines described in section
 10388 of the Research and Development,
 Competition, and Innovation Act (42
 U.S.C. 19108) involved in battery and
 mineral processing technologies.”;

(ii) by redesignating subparagraph
 (C) as subparagraph (D); and

(iii) by inserting after subparagraph
 (B) the following:

“(C) APPLICATION.—

“(i) IN GENERAL.—An eligible entity
 seeking a grant under the program shall
 submit to the Secretary an application at
 such time, in such manner, and containing
 such information as the Secretary deter-
 mines necessary.

“(ii) WORKFORCE SAFETY AND FIRE
 PLAN.—An application submitted under
 clause (i) shall include, within any required
 community benefits plan, a workforce safe-
 ty and fire plan, which shall include con-
 ducting outreach to best prepare local first

1 responders for any potential emergency
 2 needs related to their operations or work-
 3 force.”; and

4 (B) in paragraph (4)—

5 (i) by striking “There is” and insert-
 6 ing the following:

7 “(A) FISCAL YEARS 2022 THROUGH 2026.—

8 There is”; and

9 (ii) by adding at the end the fol-
 10 lowing:

11 “(B) FISCAL YEARS 2027 THROUGH 2031.—

12 There is authorized to be appropriated to the
 13 Secretary to carry out the program and the
 14 program established under subsection (c)
 15 \$6,000,000,000 for the period of fiscal years
 16 2027 through 2031, to remain available until
 17 expended, subject to the condition that not less
 18 than 33 percent shall be made available to sup-
 19 port the program established under that sub-
 20 section.”; and

21 (2) in subsection (c)—

22 (A) in paragraph (3)—

23 (i) in subparagraph (A)—

24 (I) in clause (ii), by striking

25 “and” at the end;

1 (II) in clause (iii), by striking the
2 period at the end and inserting “;
3 and”; and

4 (III) by adding at the end the
5 following:

6 “(iv) to invest in 1 or more workforce
7 training or education consortia that sup-
8 port the battery, battery manufacturing, or
9 critical mineral operations of local proc-
10 essing facilities, including eligible consortia
11 described in section 28(c) of the Steven-
12 son-Wylder Technology Innovation Act of
13 1980 (15 U.S.C. 3722a(c)) and regional
14 innovation engines described in section
15 10388 of the Research and Development,
16 Competition, and Innovation Act (42
17 U.S.C. 19108) involved in battery and
18 mineral processing technologies.”;

19 (ii) by redesignating subparagraph
20 (C) as subparagraph (D); and

21 (iii) by inserting after subparagraph
22 (B) the following:

23 “(C) APPLICATION.—

24 “(i) IN GENERAL.—An eligible entity
25 seeking a grant under the program shall

1 submit to the Secretary an application at
 2 such time, in such manner, and containing
 3 such information as the Secretary deter-
 4 mines necessary.

5 “(ii) RISK MITIGATION PLAN.—An ap-
 6 plication submitted under clause (i) shall
 7 include a risk mitigation plan that includes
 8 workforce recruitment and retention, com-
 9 munity engagement, and a workforce safe-
 10 ty and fire plan, which shall include con-
 11 ducting outreach to best prepare local first
 12 responders for any potential emergency
 13 needs related to their operations or work-
 14 force.”; and

15 (B) in paragraph (4)—

16 (i) by striking “There is” and insert-
 17 ing the following:

18 “(A) FISCAL YEARS 2022 THROUGH 2026.—

19 There is”; and

20 (ii) by adding at the end the fol-
 21 lowing:

22 “(B) FISCAL YEARS 2027 THROUGH 2031.—

23 For the period of fiscal years 2027 through
 24 2031, the Secretary shall carry out the program

1 using the amounts made available under sub-
2 section (b)(4)(B).”.

3 **SEC. 4. OFFICE OF CRITICAL MINERALS AND ENERGY IN-**
4 **NOVATION.**

5 (a) DEFINITIONS.—In this section:

6 (1) COVERED PROJECT.—The term “covered
7 project” means a project funded or managed by the
8 Department relating to—

9 (A) capacity expansion of manufacturing
10 and energy supply chains for key energy tech-
11 nologies, including batteries, building and en-
12 ergy efficiency, critical minerals and recycling,
13 energy generation and fuels, including geo-
14 thermal, grid equipment, and industrial base
15 capabilities essential for national defense;

16 (B) energy or productivity assessments of
17 small and medium-sized manufacturers, clean
18 energy supply chains, and academic institutions;
19 and

20 (C) workforce development, recruitment,
21 and training relating to subparagraphs (A) and
22 (B).

23 (2) DIRECTOR.—The term “Director” means
24 the head of the Office appointed under subsection
25 (c).

1 (3) OFFICE.—The term “Office” means the Of-
 2 fice of Critical Minerals and Energy Innovation es-
 3 tablished under subsection (b).

4 (b) ESTABLISHMENT.—

5 (1) IN GENERAL.—The Secretary shall establish
 6 an office, to be known as the “Office of Critical Min-
 7 erals and Energy Innovation”.

8 (2) PURPOSE.—The purpose of the Office is to
 9 eliminate vulnerabilities in the United States energy
 10 supply chain for purposes of enduring energy resil-
 11 ience and independence—

12 (A) by catalyzing United States processing
 13 and manufacturing capacity;

14 (B) by reinvigorating the manufacturing
 15 workforce through education and training op-
 16 portunities; and

17 (C) by generating data-backed supply
 18 chain insights to inform policies and private
 19 and public investments.

20 (3) INTERAGENCY COLLABORATION.—

21 (A) IN GENERAL.—As applicable, the Di-
 22 rector shall coordinate and collaborate with
 23 interagency partners, including the agencies de-
 24 scribed in subparagraph (B), on energy supply
 25 chain analysis that may be used to lessen

1 vulnerabilities of the United States and allies of
2 the United States.

3 (B) AGENCIES DESCRIBED.—The agencies
4 referred to in subparagraph (A) are—

5 (i) the Department of Defense;

6 (ii) the National Security Council;

7 (iii) the Export-Import Bank of the
8 United States;

9 (iv) the Development Finance Co-
10 operation;

11 (v) the Department of the Treasury;

12 (vi) the United States Agency for
13 International Development; and

14 (vii) the Department of Commerce.

15 (c) DIRECTOR.—The Secretary shall appoint a Direc-
16 tor to be head of the Office.

17 (d) DUTIES.—The Director shall, in coordination
18 with the heads of relevant program offices of the Depart-
19 ment, as appropriate—

20 (1) provide financial assistance to, administer,
21 provide interagency coordination of, or conduct over-
22 sight of the administration of, as applicable, covered
23 projects, including programs described in subsection
24 (e);

1 (2) evaluate proposals for covered projects, in-
2 cluding scope, technical specifications, maturity of
3 design, funding profile, estimated costs, proposed
4 schedule, proposed technical and financial mile-
5 stones, and potential for commercial success based
6 on economic and policy projections;

7 (3) recommend to the head of a program office
8 of the Department, as appropriate, whether a pro-
9 posal for a covered project will enhance the domestic
10 energy supply chain;

11 (4)(A) conduct reviews of ongoing covered
12 projects, including evaluating the progress of a cov-
13 ered project based on the proposed schedule and
14 technical and financial milestones; and

15 (B) provide those reviews to the Secretary;

16 (5) provide analysis to Departmental leadership
17 to ensure that the Department has a balanced port-
18 folio of investments in covered projects;

19 (6) provide to the Secretary expertise and ad-
20 vice on policies and financial support for manufac-
21 turing and energy supply chains;

22 (7) assess lessons learned in overseeing covered
23 projects and implement improvements in the process
24 of evaluating and overseeing covered projects; and

1 (8) conduct outreach and technical assistance to
2 entities that may best utilize the programs or anal-
3 yses of the Office.

4 (e) PROGRAMS DESCRIBED.—Programs referred to
5 in subsection (d)(1) are the following:

6 (1) The programs authorized under subsections
7 (b), (c), (f)(3), and (f)(4) of section 40207 of the In-
8 frastructure Investment and Jobs Act (42 U.S.C.
9 18741).

10 (2) The advanced energy manufacturing and re-
11 cycling grant program established under section
12 40209 of the Infrastructure Investment and Jobs
13 Act (42 U.S.C. 18742).

14 (3) The State manufacturing leadership pro-
15 gram authorized under section 40534 of the Infra-
16 structure Investment and Jobs Act (42 U.S.C.
17 18814).

18 (4) Programs authorized under title III of the
19 Defense Production Act of 1950 (50 U.S.C. 4531 et
20 seq.).

21 (5) The domestic manufacturing conversion
22 grant program authorized under section 50143 of
23 Public Law 117–169 (commonly referred to as the
24 “Inflation Reduction Act”) (136 Stat. 2044).

1 (6) The extended product system rebate pro-
2 gram authorized under section 1005 of the Energy
3 Act of 2020 (42 U.S.C. 6311 note; Public Law 116–
4 260).

5 (7) The energy efficient transformer rebate pro-
6 gram authorized under section 1006 of the Energy
7 Act of 2020 (42 U.S.C. 6317 note; Public Law 116–
8 260).

9 (8) The rare earth demonstration facility estab-
10 lished under section 7001(c) of the Energy Act of
11 2020 (42 U.S.C. 13344(c)).

12 (9) Grants provided under subsections (b) and
13 (i) of section 457 of the Energy Independence and
14 Security Act of 2007 (42 U.S.C. 17116).

15 (10) The qualifying advanced energy project
16 credit under section 48C of the Internal Revenue
17 Code of 1986 as carried out pursuant to agreements
18 with the Internal Revenue Service.

19 (11) Any programs authorized to be carried out
20 by the Office after the date of enactment of this Act.

21 (f) EMPLOYEES.—The Secretary may hire or align
22 existing appropriate personnel for the operation of the Of-
23 fice.

24 (g) COORDINATION.—The Director shall coordinate
25 with—

1 (1) project management, workforce develop-
2 ment, capital programs, acquisition management,
3 and energy information entities within the Depart-
4 ment, including the Office of Project Management,
5 the Office of State and Community Energy Pro-
6 grams, the Office of Indian Energy Policy and Pro-
7 grams, the Advanced Research Projects Agency—
8 Energy, the Office of Clean Energy Demonstrations,
9 the Office of Critical and Emerging Technologies,
10 the Loan Programs Office, and the Office of Tech-
11 nology Transitions;

12 (2) the Energy Information Administration;

13 (3) the Assistant Secretary for Energy Effi-
14 ciency and Renewable Energy; and

15 (4) professional organizations in project man-
16 agement, construction, cost estimation, capital mar-
17 kets, energy information, workforce development,
18 and other relevant fields.

19 (h) REPORTS.—The Secretary shall submit to the
20 Committee on Energy and Natural Resources and the
21 Committee on Commerce, Science, and Transportation of
22 the Senate and the Committee on Energy and Commerce
23 of the House of Representatives an annual report that de-
24 scribes, for the year covered by the report—

1 (1) the activities carried out to implement this
2 section;

3 (2) progress made by the Office to strengthen
4 and scale the clean energy supply chains of the
5 United States through—

6 (A) transformative manufacturing capacity
7 investments;

8 (B) targeted workforce investments to
9 build up the energy workforce of the future;
10 and

11 (C) cutting-edge energy supply chain vul-
12 nerability and innovation analysis;

13 (3) a description of the processes and proce-
14 dures used by the Office to evaluate proposals of
15 covered projects and to oversee covered projects; and

16 (4) any recommended changes to—

17 (A) the processes and procedures described
18 in paragraph (3); and

19 (B) the structure or duties of the Office.

20 **SEC. 5. GRANT PROGRAM FOR PROCESSING OF CRITICAL**
21 **MINERALS AND DEVELOPMENT OF CRITICAL**
22 **MINERALS AND METALS.**

23 Section 40210 of the Infrastructure Investment and
24 Jobs Act (42 U.S.C. 18743) is amended by adding at the
25 end the following:

1 “(e) AUTHORIZATION OF APPROPRIATIONS.—There
2 is authorized to be appropriated to the Secretary to carry
3 out this section \$100,000,000 for each of fiscal years 2027
4 through 2031.”.

5 **SEC. 6. REPORTING ON THE DEVELOPMENT OF CERTAIN**
6 **TECHNOLOGIES.**

7 Not later than 2 years after the date of enactment
8 of this Act and every 2 years thereafter through 2031,
9 the Secretary shall submit to the Committee on Energy
10 and Natural Resources of the Senate and the Committee
11 on Science, Space, and Technology of the House of Rep-
12 resentatives a report describing—

13 (1) the activities undertaken pursuant to this
14 Act, including—

15 (A) the status of public-private partner-
16 ships;

17 (B) the progress of the programs under
18 sections 7, 8, 11, and 12 in meeting goals and
19 timelines; and

20 (C) a strategic plan for funding activities
21 across Federal agencies; and

22 (2) the technologies and knowledge developed
23 and demonstrated as a result of those activities, with
24 a particular emphasis on whether those technologies
25 were successfully adopted for commercial applica-

1 tions, and if so, whether products relying on those
 2 technologies are manufactured in the United States.

3 **SEC. 7. ADVANCED VEHICLE RESEARCH AND DEVELOP-**
 4 **MENT.**

5 (a) DEFINITIONS.—In this section:

6 (1) EXTREME-FAST CHARGING.—The term “ex-
 7 treme-fast charging” means recharging up to 80
 8 percent of battery capacity in approximately 10 min-
 9 utes or less.

10 (2) PROGRAM.—The term “program” means
 11 the research, development, and pilot scale dem-
 12 onstration program established under subsection (b).

13 (3) SUSTAINABLE MATERIAL.—The term “sus-
 14 tainable material” means material used throughout
 15 the consumer and industrial economy that can be
 16 produced in required volumes without—

17 (A) depleting nonrenewable resources; or

18 (B) disrupting the established steady-state
 19 equilibrium of the environment and key natural
 20 resource systems.

21 (4) TRANSFORMATIONAL NONROAD VEHICLE
 22 TECHNOLOGY.—The term “transformational
 23 nonroad vehicle technology” means an innovative
 24 technology that—

1 (A) enables advanced nonroad transpor-
2 tation, nonroad transportation components, and
3 related energy technologies that have the poten-
4 tial to produce significantly lower emissions and
5 greater energy savings than current commercial
6 technologies;

7 (B) enables improved or expanded supply
8 and production of domestic emission reducing
9 fuels and components; or

10 (C) ensures the long term, secure, and sus-
11 tainable supply of critical materials.

12 (b) ADVANCED VEHICLE RESEARCH AND DEVELOP-
13 MENT PROGRAM.—

14 (1) IN GENERAL.—The Secretary shall support
15 a research, development, and pilot scale demonstra-
16 tion program relating to more efficient, sustainable,
17 resilient, safe, and domestically available technology,
18 sustainable materials, and manufacturing processes
19 for advanced vehicle technologies that have the po-
20 tential—

21 (A) to substantially reduce or eliminate
22 greenhouse gas emissions from the manufacture
23 and use of passenger and commercial vehicles;

24 (B) to reduce the cost of vehicle manufac-
25 turing and ownership; and

1 (C) to reduce dependence on foreign en-
2 ergy sources.

3 (2) PROGRAM COMPONENTS.—

4 (A) IN GENERAL.—In carrying out the
5 program, the Secretary shall focus on research,
6 development, and demonstration challenges
7 across the full vehicle ecosystem (from the sup-
8 ply chain through manufacturing and end-of-
9 life), including, to the maximum extent prac-
10 ticable, activities in the areas of—

11 (i) electrification of vehicle systems,
12 including compact and efficient electric
13 drivetrain systems;

14 (ii) power electronics, electric ma-
15 chines, and electric machine drive systems,
16 which may include—

17 (I) electronic motors, including
18 advanced inverters and motors that
19 can be used for passenger vehicles and
20 commercial vehicles;

21 (II) magnetic materials, including
22 permanent magnets with reduced or
23 without critical materials;

24 (III) improvement of partial load
25 efficiency;

1 (IV) design of power electronics
2 and electric motor technologies that
3 enable efficient recycling of critical
4 materials; and

5 (V) assessment of potential im-
6 pacts of various vehicle systems on
7 electric propulsion performance, in-
8 cluding potential impacts from AM/
9 FM radio frequencies;

10 (iii) vehicle batteries and relevant sys-
11 tems, which may include—

12 (I) advanced batteries systems,
13 ultracapacitors, and other competitive
14 energy storage devices;

15 (II) common interconnection pro-
16 tocols, specifications, and architecture
17 for transportation and stationary bat-
18 tery applications;

19 (III) energy density and capacity,
20 recharging robustness, extreme-fast
21 charging and wireless charging capa-
22 bilities, and efficiencies to lower cost;

23 (IV) lifetime improvement and
24 reduction of potential lifecycle impacts
25 from advanced batteries;

1 (V) improvement of efficient use
2 and reuse, substitution, and recycling
3 of critical materials in vehicles, includ-
4 ing rare earth elements and precious
5 metals, at risk of supply disruption;

6 (VI) advanced battery protection
7 systems for safe handling of high-volt-
8 age power and thermal management;

9 (VII) technologies that enable
10 flexible manufacturing facilities that
11 can accommodate different vehicle
12 battery chemistries and configura-
13 tions; and

14 (VIII) improvement of the effi-
15 ciency and safety of the manufac-
16 turing of advanced batteries;

17 (iv) vehicle components and systems,
18 including manufacturing technologies and
19 processes, which may include—

20 (I) reducing or repurposing waste
21 streams, reducing emissions, and re-
22 ducing energy intensity of vehicle, en-
23 gine, and advanced battery manufac-
24 turing processes; and

1 (II) increasing the production
2 rate, and decreasing the cost of, ad-
3 vanced battery and hydrogen fuel cell
4 manufacturing, including manufac-
5 turing of purpose-built hydrogen fuel
6 cell vehicles, hydrogen fueling infra-
7 structure, and components;

8 (v) hybrid and alternative fuel vehicles
9 and fuel pathways, which may include—

10 (I) vehicle fuel cells and relevant
11 systems, including power electronics
12 systems to regulate fuel cell voltages;

13 (II) synthetic fuels from recycled
14 carbon dioxide and net-zero carbon
15 liquid fuels; and

16 (III) advanced biofuel tech-
17 nologies;

18 (vi) lubricants and accessory power
19 loads for hybrid and electric vehicles after
20 treatment technologies;

21 (vii) vehicle weight reduction, which
22 may include the development of—

23 (I) more sustainable materials or
24 cost-effective lightweight materials;
25 and

- 1 (II) higher efficiency manufac-
2 turing processes, such as additive
3 manufacturing, to produce sustainable
4 materials or lightweight materials and
5 fabricate, assemble, and use dissimilar
6 materials, including—
- 7 (aa) lightweight systems
8 that combine several existing ve-
9 hicle components; and
- 10 (bb) voluntary, consensus-
11 based standards for strategic
12 lightweight materials;
- 13 (viii) improved vehicle recycling meth-
14 ods to increase the recycled material con-
15 tent of feedstocks used in raw material
16 manufacturing;
- 17 (ix) vehicle propulsion systems, which
18 may include—
- 19 (I) engine and component dura-
20 bility;
- 21 (II) engine down speeding;
- 22 (III) advanced internal combus-
23 tion engines;
- 24 (IV) transmission gear and en-
25 gine operation matching; and

1 (V) advanced transmission tech-
2 nologies;

3 (x) applying advanced computing re-
4 sources to large, voluntarily provided in-
5 dustry datasets from providers and cities
6 to support the development of predictive
7 engineering, modeling, and simulation of
8 components, vehicles, and transportation
9 systems;

10 (xi) leveraging the use of machine
11 learning toward manufacturing and addi-
12 tive manufacturing optimization, which
13 may include assessing the efficiency and
14 safety of manufacturing processes;

15 (xii) advanced computing systems, in-
16 cluding energy efficient systems, tech-
17 nology, and networking, for vehicular on-
18 board, off-board, and edge computing ap-
19 plications;

20 (xiii) assessing automation in both ve-
21 hicle and infrastructure systems;

22 (xiv) infrastructure, which may in-
23 clude—

24 (I) refueling and charging infra-
25 structure for alternative fueled and

1 electric drive or plug-in electric hybrid
2 vehicles, with consideration for the
3 unique challenges facing urban and
4 rural areas;

5 (II) extreme-fast charging, in-
6 cluding through wired and wireless
7 charging systems;

8 (III) integration, bidirectional ca-
9 pability, and operational optimization
10 of vehicle electrification for light-duty,
11 medium-duty, and heavy-duty vehicles
12 with charging infrastructure and the
13 electric grid; and

14 (IV) sensing, communications,
15 and actuation technologies for vehi-
16 cles, the electric grid, and infrastruc-
17 ture, which may include—

18 (aa) communication, on-
19 board sensing, and connectivity
20 among vehicles, infrastructure,
21 pedestrians, and the electric grid;

22 (bb) assessing the use of au-
23 tonomous vehicles or connectivity
24 to improve roadway throughput;
25 and

1 (cc) autonomous refueling
2 and charging technologies and in-
3 frastructure;

4 (xv) retrofitting advanced vehicle tech-
5 nologies to existing vehicles;

6 (xvi) informing and educating the
7 public on the energy benefits of automa-
8 tion, electrification, and connected vehicle
9 technologies, connected infrastructure as-
10 sets, and mobility applied sensors;

11 (xvii) reusing valuable components
12 and materials, such as permanent magnets
13 and other electric drive components for ad-
14 vanced vehicles;

15 (xviii) transportation system analysis
16 to further understand the energy implica-
17 tions and opportunities of advanced mobil-
18 ity solutions and communication and
19 connectivity among vehicles, infrastructure,
20 pedestrians, and the electric grid; and

21 (xix) other innovative advanced vehicle
22 technology-focused research and develop-
23 ment, as determined by the Secretary.

24 (B) TECHNICAL MILESTONES.—The Sec-
25 retary shall determine a comprehensive set of

1 technical milestones for research and develop-
2 ment carried out under the program.

3 (3) COORDINATION.—In carrying out para-
4 graph (2), the Secretary shall coordinate with—

5 (A) the program established under section
6 137 of the Energy Independence and Security
7 Act of 2007 (42 U.S.C. 17014); and

8 (B) the program established under section
9 641(q) of the United States Energy Storage
10 Competitiveness Act of 2007 (42 U.S.C.
11 17231(q)).

12 (c) NONROAD TRANSPORTATION ENVIRONMENTAL
13 AND TECHNICAL ASSISTANCE RESEARCH.—

14 (1) ACTIVITIES.—

15 (A) IN GENERAL.—In carrying out the
16 program, the Secretary, in consultation with the
17 heads of relevant Federal agencies, shall sup-
18 port research, development, and demonstration
19 activities to address and reduce nonroad sector
20 emissions from transportation fuels used in
21 aviation, rail, and maritime technologies and
22 other relevant technologies.

23 (B) ENERGY INNOVATION HUB.—The ac-
24 tivities described in subparagraph (A) may be
25 carried out primarily by an Energy Innovation

1 Hub established pursuant to section 206 of the
2 Department of Energy Research Coordination
3 Act (42 U.S.C. 18632).

4 (2) PURPOSES.—The purposes of the activities
5 described in paragraph (1) shall be—

6 (A) to identify, study, evaluate, test, and
7 demonstrate emerging transformational
8 nonroad vehicle energy technologies and prac-
9 tices to improve environmental performance to
10 meet Federal and international standards and
11 guidelines, including reducing greenhouse gas
12 emissions, water emissions, or other particulate
13 or toxic emissions;

14 (B) to advance research, development, and
15 demonstration activities—

16 (i) to overcome barriers in trans-
17 formational nonroad vehicle energy tech-
18 nologies, including alternative fuels such as
19 hydrogen, components, and other energy
20 technologies, to improve total machine or
21 system efficiency for nonroad mobile equip-
22 ment; and

23 (ii) to increase the fuel economy and
24 use of alternative fuels and alternative en-
25 ergy;

1 (C) to support opportunities to transfer
2 relevant research findings and technologies be-
3 tween the nonroad and on-highway equipment
4 and vehicle sectors; and

5 (D) to test relevant precommercial tech-
6 nologies.

7 (3) COORDINATION.—The Secretary may co-
8 ordinate the activities described in paragraph (1)
9 with activities—

10 (A) that are associated with the develop-
11 ment or approval of validation and testing re-
12 gimes; and

13 (B) related to certification or validation of
14 emerging energy technologies or practices that
15 demonstrate significant environmental or other
16 benefits to domestic non-road transportation in-
17 dustries.

18 (4) ASSISTANCE.—The Secretary may enter
19 into cooperative agreements, contracts, or other
20 agreements with academic, public, private, and non-
21 governmental entities and facilities to carry out the
22 activities described in paragraph (1).

23 (d) STANDARD OF REVIEW.—The Secretary shall pe-
24 riodically review activities carried out under this section

1 to determine the achievement of technical milestones, as
 2 determined by the Secretary.

3 (e) TECHNOLOGY TESTING AND METRICS.—In car-
 4 rying out the program, the Secretary, in coordination with
 5 the National Institute of Standards and Technology,
 6 shall—

7 (1) develop voluntary, consensus-based standard
 8 testing procedures, methodologies, and best practices
 9 for evaluating the performance of advanced vehicle
 10 technologies, including heavy vehicle technologies
 11 under a range of representative duty cycles and op-
 12 erating conditions, including for electrified and hy-
 13 drogen fuel cell systems; and

14 (2) evaluate advanced vehicle performance, in-
 15 cluding heavy vehicle and nonroad vehicle perform-
 16 ance using work performance-based metrics.

17 **SEC. 8. ADVANCED ON-ROAD VEHICLE SECURITY PRO-**
 18 **GRAM.**

19 (a) IN GENERAL.—The Secretary shall establish a re-
 20 search and development program focused on—

21 (1) the cybersecurity and physical security of
 22 interconnections between vehicles, vehicle energy
 23 storage systems, charging equipment, buildings, and
 24 the electric grid for—

25 (A) plug-in electric vehicles;

1 (B) connected vehicles;

2 (C) autonomous vehicles; and

3 (D) other relevant vehicles; and

4 (2) the security impacts, efficiency, and safety
5 of plug-in electric vehicles using alternating current
6 charging, high-power direct current fast charging,
7 and extreme fast charging.

8 (b) COORDINATION.—The Secretary shall establish
9 and carry out the program under subsection (a) in coordi-
10 nation with—

11 (1) the program established under section 7(b);

12 (2) the program established under section 137
13 of the Energy Independence and Security Act of
14 2007 (42 U.S.C. 17014); and

15 (3) the heads of relevant Federal agencies.

16 (c) ASSESSMENT.—The Secretary shall develop a 5-
17 to 10-year impact assessment of emergent cybersecurity
18 threats to, and vulnerabilities of, the United States on-
19 road transportation system and connected infrastructure
20 by identifying—

21 (1) areas of research with respect to which Fed-
22 eral crossagency research coordination and coopera-
23 tion may help address those threats and
24 vulnerabilities; and

1 (2) current research and challenges associated
2 with cyberphysical protection and resiliency of elec-
3 tric, connected, and automated vehicle technologies.

4 (d) INFORMATION TO ASSESS BARRIERS IN ALTER-
5 NATIVE FUEL DELIVERY, DISTRIBUTION, AND TRANS-
6 MISSION.—

7 (1) REQUEST.—Not later than 1 year after the
8 date of enactment of this Act, the Secretary shall
9 publish a request for information on the technical,
10 economic, and knowledge barriers for delivery, dis-
11 tribution, and transmission of alternative fuels, in-
12 cluding—

13 (A) barriers associated with electric grid
14 load management and applications, including
15 applications that will allow bidirectional bat-
16 teries in plug-in electric drive vehicles to be
17 used for grid storage, ancillary services provi-
18 sion, and backup power;

19 (B) barriers associated with integration of
20 plug-in bidirectional electric drive vehicles with
21 smart grid technology, including necessary
22 equipment, and information technology systems;

23 (C) technical and economic barriers to de-
24 livery technologies for hydrogen and biofuels

1 sufficient to support widespread consumer use;
2 and

3 (D) any other barriers to installing suffi-
4 cient and regionally appropriate alternative fuel
5 recharging and refueling infrastructure, includ-
6 ing sufficiency and efficient use of zero-emis-
7 sions generation and transmission capabilities.

8 (2) USE OF INFORMATION.—The Secretary
9 shall use information provided in response to the re-
10 quest under paragraph (1) to identify gaps in public
11 and private research, development, and demonstra-
12 tion activities needed to be addressed to overcome
13 the barriers described in that paragraph.

14 (3) CONSULTATION.—In carrying out para-
15 graph (2), the Secretary shall coordinate with—

16 (A) State, local, and Tribal governments;

17 (B) stakeholders in academia and relevant
18 industries; and

19 (C) the electric vehicle working group es-
20 tablished under section 25006 of the Infrastruc-
21 ture Investment and Jobs Act (23 U.S.C. 151
22 note; Public Law 117–58).

23 (4) REPORT.—Not later than 2 years after the
24 date of enactment of this Act, the Secretary shall
25 submit to the Committee on Energy and Natural

1 Resources of the Senate and the Committee on
2 Science, Space, and Technology of the House of
3 Representatives a report summarizing the findings
4 under this subsection.

5 **SEC. 9. VEHICLE ENERGY STORAGE SYSTEM SAFETY PRO-**
6 **GRAM.**

7 (a) IN GENERAL.—In coordination with the program
8 established under section 7(b), the Secretary shall support
9 a program of research, development, and demonstration
10 of vehicle energy storage safety and reliability.

11 (b) ACTIVITIES.—In carrying out the program under
12 subsection (a), the Secretary shall support activities—

13 (1) to examine the mechanisms that lead to ve-
14 hicle energy storage system safety and reliability in-
15 cidents;

16 (2) to develop new materials to improve overall
17 vehicle energy storage system safety and abuse toler-
18 ance;

19 (3) to perform abuse testing;

20 (4) to advance and perform testing techniques;

21 (5) to demonstrate detailed failure analyses;

22 (6) to mitigate vehicle energy storage cell and
23 system failures, including hydrogen fuel storage tank
24 failures;

1 (7) to develop crush-induced battery safety pro-
 2 ocols and technical standards to improve
 3 robustness;

4 (8) to develop suggested worker safety and
 5 emergency response procedures for hazards related
 6 to battery manufacturing;

7 (9) to develop new materials and equipment for
 8 battery hazard suppression and fire dangers; and

9 (10) to carry out other innovative energy stor-
 10 age safety-focused research and development, as de-
 11 termined by the Secretary.

12 **SEC. 10. ADVANCED VEHICLE TECHNOLOGIES ADVISORY**
 13 **COMMITTEE.**

14 (a) ESTABLISHMENT.—

15 (1) IN GENERAL.—Not later than 180 days
 16 after the date of enactment of this Act, the Sec-
 17 retary shall establish the Advanced Vehicle Tech-
 18 nologies Advisory Committee (referred to in this sec-
 19 tion as the “advisory committee”) to advise the Sec-
 20 retary on vehicle technology and mobility system re-
 21 search advancements.

22 (2) MEMBERSHIP.—The advisory committee
 23 shall be composed of not fewer than 15 members
 24 who are qualified to provide advice on the research,
 25 development, and demonstration activities under this

1 Act (in this section referred to as the “DOE Vehicle
2 Program”), including representatives from research
3 and academic institutions, environmental organiza-
4 tions, industry, and nongovernmental entities, in-
5 cluding relevant labor organizations and associations
6 representing automobile manufacturers.

7 (b) ASSESSMENT.—The advisory committee shall as-
8 sess—

9 (1) the current state of United States competi-
10 tiveness in advancing vehicle technologies and mobil-
11 ity systems, including—

12 (A) the scope and scale of United States
13 investments in sustainable and advanced trans-
14 portation research, development, and dem-
15 onstration; and

16 (B) the scope and scale of research, devel-
17 opment, and demonstration activities to lower
18 vehicle and fuel lifecycle greenhouse gas emis-
19 sions;

20 (2) progress made in implementing the DOE
21 Vehicle Program, including progress toward meeting
22 the technical milestones as determined by the Sec-
23 retary pursuant to section 7;

1 (3) the balance of research and development ac-
2 tivities and funding across the DOE Vehicle Pro-
3 gram;

4 (4) the management, coordination, implementa-
5 tion, and activities of the DOE Vehicle Program;

6 (5) whether environmental, safety, security, and
7 other appropriate issues are adequately addressed by
8 the DOE Vehicle Program; and

9 (6) other relevant topics, as determined by the
10 Secretary.

11 (c) REPORTS.—Not later than 2 years after the date
12 of enactment of this Act and not less frequently than once
13 every 3 years thereafter, the advisory committee shall sub-
14 mit to the Secretary, the Committee on Energy and Nat-
15 ural Resources of the Senate, and the Committee on
16 Science, Space, and Technology of the House of Rep-
17 resentatives a report on—

18 (1) the findings of the assessments of the advi-
19 sory committee under subsection (b); and

20 (2) the recommendations of the advisory com-
21 mittee for ways to improve or revise the DOE Vehi-
22 cle Program.

23 (d) APPLICATION OF FEDERAL ADVISORY COM-
24 MITTEE ACT.—Chapter 10 of title 5, United States Code
25 (commonly known as the “Federal Advisory Committee

1 Act”) (except for section 1013 of that title), shall apply
 2 to the advisory committee.

3 **SEC. 11. MEDIUM-DUTY AND HEAVY-DUTY COMMERCIAL**
 4 **AND TRANSIT VEHICLES PROGRAM.**

5 (a) IN GENERAL.—In coordination with the program
 6 established under section 7(b), the Secretary shall support
 7 a program of research, development, and demonstration
 8 activities of advanced energy technologies for medium-
 9 duty and heavy-duty commercial, vocational, recreational,
 10 and transit vehicles, on-road and nonroad, including, to
 11 the maximum extent practicable, activities in the areas
 12 of—

13 (1) vehicle engines, which may include—

14 (A) engine efficiency, emission controls,
 15 and combustion research;

16 (B) energy- and space-efficient emissions
 17 control systems;

18 (C) engine idle and parasitic energy loss
 19 reduction;

20 (D) advanced internal combustion engines;
 21 and

22 (E) engine down speeding;

23 (2) electric drivetrains, including—

24 (A) durable, highly efficient power elec-
 25 tronics and electric machinery research;

- 1 (B) partial load efficiency improvements;
- 2 (C) control and coordination research for
- 3 electric drive systems using multiple electric
- 4 motors;
- 5 (D) regenerative braking to recoup braking
- 6 energy; and
- 7 (E) high-fidelity modeling to accelerate de-
- 8 sign and adoption of electrified commercial ve-
- 9 hicles;
- 10 (3) friction and wear reduction;
- 11 (4) improved aerodynamics and tire rolling re-
- 12 sistance;
- 13 (5) advanced lightweighting materials and vehi-
- 14 cle designs;
- 15 (6) synthetic fuels from recycled carbon dioxide
- 16 and other net-zero carbon liquid fuels;
- 17 (7) vehicle batteries, including—
- 18 (A) complete vehicle and battery pack
- 19 modeling, simulation, and testing; and
- 20 (B) thermal management of battery sys-
- 21 tems;
- 22 (8) mild hybrid, heavy hybrid, plug-in hybrid,
- 23 and electric platforms and energy storage tech-
- 24 nologies, including—

1 (A) identifying and developing solutions for
2 technical barriers to advance batteries;

3 (B) electric drive systems; and

4 (C) charging and refueling systems for me-
5 dium-duty commercial and heavy-duty freight
6 delivery vehicles;

7 (9) vehicle components, including—

8 (A) transmission and drivetrain optimiza-
9 tion, including compact and efficient electric
10 drivetrain systems;

11 (B) waste heat recovery and conversion;

12 (C) electrification of steering systems,
13 braking systems, and accessory loads;

14 (D) onboard sensing, computing, and com-
15 munications technologies; and

16 (E) advanced battery protection systems
17 for safe handling of high voltage power;

18 (10) relevant infrastructure, including
19 bidirectional capability, beyond megawatt charging,
20 and increasing load capacity per vehicle;

21 (11) recharging infrastructure and compressed
22 natural gas infrastructure;

23 (12) hydrogen vehicle technologies, including—

24 (A) fuel cells;

25 (B) hydrogen-fueling infrastructure;

1 (C) the development of medium-duty and
 2 heavy-duty refueling equipment design and con-
 3 cepts;

4 (D) synthetic fuels;

5 (E) onboard technologies for compressed
 6 and other advanced hydrogen storage systems;
 7 and

8 (F) advanced cooling technologies for fuel
 9 cell thermal management;

10 (13) retrofitting advanced energy technologies
 11 onto existing truck and bus fleets;

12 (14) assessment of automated and connected
 13 vehicle technologies;

14 (15) energy use strategies, including charging
 15 patterns that minimize impacts on the distribution
 16 grid and optimize the use of clean, low-cost genera-
 17 tion resources; and

18 (16) integration of advanced systems onto a
 19 single truck and trailer platform or bus.

20 (b) COORDINATION.—In carrying out the program
 21 under subsection (a), the Secretary shall coordinate with
 22 appropriate industry stakeholders, including relevant labor
 23 organizations.

24 (c) MEDIUM-DUTY AND HEAVY-DUTY SYSTEMS RE-
 25 SEARCH, DEVELOPMENT, AND DEMONSTRATION.—

1 (1) IN GENERAL.—The Secretary shall award
 2 financial assistance for the research, development,
 3 and demonstration of the integration of multiple ad-
 4 vanced energy technologies and advanced operational
 5 efficiency for medium-duty and heavy-duty platforms
 6 and trailers, including the integration of technologies
 7 described in subsection (a).

8 (2) APPLICANT.—Applicants applying for as-
 9 sistance under paragraph (1) include—

- 10 (A) truck and trailer manufacturers;
- 11 (B) engine and component manufacturers;
- 12 (C) hydrogen fuel cell and component man-
 13 ufacturers;
- 14 (D) public and private fleet owners and
 15 customers;
- 16 (E) university researchers; and
- 17 (F) other applicants, as determined by the
 18 Secretary.

19 **SEC. 12. ENERGY-EFFICIENT MOBILITY SYSTEMS PRO-**
 20 **GRAM.**

21 (a) IN GENERAL.—In coordination with the program
 22 established under section 7(b), the Secretary shall support
 23 a program of research, development, and demonstration
 24 of advanced energy-efficient mobility solutions that will

1 address the potential energy impacts of advanced vehicle
2 technologies throughout the transportation sector.

3 (b) DEVELOPMENT OF TOOLS.—The program under
4 subsection (a) shall include the development of tools, tech-
5 niques, processes, and capabilities to understand and iden-
6 tify essential components to improve the energy produc-
7 tivity of integrated mobility systems.

8 (c) ACTIVITIES.—In carrying out this subsection, the
9 Secretary shall support activities—

10 (1) to improve the energy and mobility impacts
11 of emerging and potentially disruptive technologies
12 and services;

13 (2) to assess automated vehicle computing loads
14 and capabilities;

15 (3) to improve onboard sensing and external
16 connectivity, including vehicle-to-vehicle, vehicle-to-
17 infrastructure, and vehicle-to-everything connectivity;

18 (4) to maximize vehicle energy efficiency for
19 connected vehicles under real-world driving condi-
20 tions;

21 (5) to assess methods to use autonomous vehi-
22 cles or connectivity to improve roadway throughput;

23 (6) to research advance autonomous refueling
24 and charging technologies and infrastructure;

1 (7) to apply machine learning with high-per-
 2 formance computing resources to large industry
 3 datasets from providers and cities to develop pre-
 4 dictive capabilities for the transportation system;

5 (8) to optimize systems for mobility, grid, and
 6 buildings to support vehicle electrification and vehi-
 7 cle automation from light-duty to heavy-duty vehi-
 8 cles, with grid stability, demand response, and reli-
 9 ability; and

10 (9) to carry out other innovative, energy-fo-
 11 cused research and development, as determined by
 12 the Secretary.

13 **SEC. 13. COORDINATION.**

14 (a) IN GENERAL.—In carrying out the activities
 15 under this Act, the Secretary shall, to the maximum extent
 16 practicable, coordinate research, development, and dem-
 17 onstration activities among—

18 (1) relevant programs of the Department, in-
 19 cluding programs carried out by—

20 (A) the Office of Energy Efficiency and
 21 Renewable Energy;

22 (B) the Office of Science;

23 (C) the Office of Electricity;

24 (D) the Office of Fossil Energy;

1 (E) the Office of Cybersecurity, Energy
2 Security, and Emergency Response;

3 (F) the Advanced Research Projects Agen-
4 cy—Energy;

5 (G) the Office of Clean Energy Dem-
6 onstrations;

7 (H) the Office of Critical Minerals and En-
8 ergy Innovation established under section 4(b);
9 and

10 (I) other offices of the Department, as de-
11 termined by the Secretary; and

12 (2) relevant technology research and develop-
13 ment programs of other Federal agencies, includ-
14 ing—

15 (A) the Department of Transportation;

16 (B) the National Institute of Standards
17 and Technology;

18 (C) the National Science Foundation;

19 (D) the Department of Defense; and

20 (E) other Federal agencies, as determined
21 by the Secretary.

22 (b) INTERGOVERNMENTAL COORDINATION.—In car-
23 rying out this Act, the Secretary shall seek opportunities
24 to leverage resources and support initiatives of Federal,

1 State, and local governments in developing advanced vehi-
2 cle technologies, manufacturing, and infrastructure.

3 **SEC. 14. AUTHORIZATION OF APPROPRIATIONS.**

4 There are authorized to be appropriated to the Sec-
5 retary for research, development, and demonstration of al-
6 ternative fuels, vehicle propulsion systems, vehicle compo-
7 nents, and other related technologies in the United States,
8 including activities authorized under this Act—

- 9 (1) for fiscal year 2027, \$530,000,000;
10 (2) for fiscal year 2028, \$556,500,000;
11 (3) for fiscal year 2029, \$584,325,000;
12 (4) for fiscal year 2030, \$613,541,250; and
13 (5) for fiscal year 2031, \$644,218,312.

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