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(Original Signature of Member)

117TH CONGRESS
2D SESSION

H. R. _____

To improve public-private partnerships and increase Federal research, development, and demonstration related to the evolution of next generation pipeline systems, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

M____. _____ introduced the following bill; which was referred to the
Committee on _____

A BILL

To improve public-private partnerships and increase Federal research, development, and demonstration related to the evolution of next generation pipeline systems, 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 “Next Generation Pipe-
5 lines Research and Development Act”.

6 **SEC. 2. DEFINITIONS.**

7 In this Act:

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

3 (2) ELIGIBLE ENTITY.—The term “eligible enti-
4 ty” means—

5 (A) an institution of higher education (as
6 such term is defined in section 101(a) of the
7 Higher Education Act of 1965 (20 U.S.C.
8 1001(a))), including historically Black colleges
9 and universities (within the meaning of the
10 term “part B institution” in section 322 of the
11 Higher Education Act of 1965 (20 U.S.C.
12 1061)), Tribal colleges and universities (as such
13 term is defined in section 316 of the Higher
14 Education Act of 1965 (20 U.S.C. 1059e)), and
15 minority serving institutions (including the enti-
16 ties described in any of paragraphs (1) through
17 (7) of section 371(a) of the Higher Education
18 Act of 1965 (20 U.S.C. 1067q(a))).

19 (B) a nonprofit research organization;

20 (C) a National Laboratory (as such term is
21 defined in section 2 of the Energy Policy Act of
22 2005 (42 U.S.C. 15801));

23 (D) a private commercial entity;

24 (E) a partnership or consortium of two or
25 more entities described in subparagraphs (A)

1 through (D) that leverages existing Department
2 efforts; or

3 (F) any other entities the Secretary deter-
4 mines appropriate.

5 (3) INITIATIVE.—The term “Initiative” means
6 the demonstration initiative established under sec-
7 tion 4.

8 (4) SECRETARY.—The term “Secretary” means
9 the Secretary of Energy.

10 **SEC. 3. COORDINATION.**

11 In carrying out this Act—

12 (1) the Secretary shall avoid unnecessary dupli-
13 cation and achieve shared mission goals by coordi-
14 nating with the Pipeline and Hazardous Materials
15 Safety Administration of the Department of Trans-
16 portation and across all relevant program offices at
17 the Department of Energy, including—

18 (A) the Office of Science;

19 (B) the Office of Fossil Energy and Car-
20 bon Management;

21 (C) the Office of Energy Efficiency and
22 Renewable Energy;

23 (D) the Office of Cybersecurity, Energy
24 Security, and Emergency Response;

1 (E) the Advanced Research Projects Agen-
2 cy–Energy;

3 (F) the Office of Clean Energy Dem-
4 onstrations; and

5 (G) any other cross-cutting program office
6 determined appropriate; and

7 (2) the Secretary of Transportation shall ensure
8 participation of and coordination with the Depart-
9 ment of Energy of—

10 (A) the Pipeline and Hazardous Materials
11 Safety Administration of the Department of
12 Transportation; and

13 (B) any other program office of the De-
14 partment of Transportation determined appro-
15 priate.

16 **SEC. 4. ADVANCED PIPELINE MATERIALS AND TECH-**
17 **NOLOGIES DEMONSTRATION INITIATIVE.**

18 (a) ESTABLISHMENT OF INITIATIVE.—The Secretary
19 shall establish a demonstration initiative under which the
20 Secretary, through a competitive merit review process,
21 shall award financial assistance to eligible entities to carry
22 out demonstration projects on low- to mid-technology
23 readiness level subjects to achieve deployment of tech-
24 nologies that—

1 (1) are applicable to pipelines and associated
2 infrastructure, including liquefied natural gas facili-
3 ties and underground and above ground gas and liq-
4 uid fuel storage facilities; and

5 (2) involve the development of next generation
6 pipeline systems, components, and related tech-
7 nologies.

8 (b) DEMONSTRATION PROJECT FOCUS AREAS.—In
9 carrying out the Initiative, the Secretary shall select dem-
10 onstration projects that best advance research undertaken
11 by the Department and the Department of Transportation
12 and incorporate a range of technology focus areas, which
13 may include the following:

14 (1) Advanced leak detection and mitigation
15 tools and technologies.

16 (2) Novel materials, including alloy and non-
17 metallic materials, to improve integrity for new and
18 existing pipelines, such as pipeline coatings, sleeves,
19 and liners, and corrosion resistant materials, includ-
20 ing maximum and minimum flow rates and immu-
21 nity to electrical discharge processes.

22 (3) Technologies and methods for retrofitting
23 existing pipelines, resolving material compatibility
24 issues, and minimizing leakage, such as field protec-
25 tive coatings and material treatment.

1 (4) Advanced manufacturing approaches for
2 producing, fitting, and coupling pipelines, including
3 the fabrication of higher performance pipeline mate-
4 rials and new extrusion technologies or methods to
5 join ultra-high strength and corrosion resistant ma-
6 terials at a scale for distribution.

7 (5) Advanced sensor technologies and processes
8 that enable real-time or in situ monitoring of pipe-
9 line assets to assess and mitigate leaks, both inter-
10 nal and external to the pipeline, which may include
11 the following:

12 (A) Wireless sensors, such as surface
13 acoustic wave sensors.

14 (B) Advanced and cost effective electro-
15 chemical sensors.

16 (C) Distributed fiber optic sensors.

17 (D) Autonomous sensor systems, including
18 uncrewed aircraft.

19 (E) Optical methods.

20 (F) Multi-use platforms for diverse
21 sources.

22 (G) Hybrid data-analysis platforms.

23 (6) Advanced computational, data analytics,
24 and machine learning models to achieve the fol-
25 lowing:

1 (A) Multiscale modeling, characterization,
2 and optimization of transmission and distribu-
3 tion systems and components to aid in planning
4 for optimized and resilient infrastructure.

5 (B) Correlation between sensor and emis-
6 sions data at all operational points and across
7 a variety of scales to assure system integrity
8 spanning large areas.

9 (C) Accurate material lifecycle predictions
10 and simulation platforms to forecast pipeline
11 health.

12 (D) Secure real time autonomous moni-
13 toring and repair capabilities.

14 (E) Mapping and monitoring of structural
15 health parameters, such as corrosion.

16 (7) Self-healing and self-repair functionalities,
17 including by chemical treatment methods.

18 (8) Autonomous robotic and patch technologies
19 for inspection and repair.

20 (9) Dynamic compressor technologies, including
21 retrofit kits for existing compressor systems.

22 (10) Strategies and technologies for integrated
23 cybersecurity considerations and countering
24 cyberattacks.

1 (11) Technologies and methods to reduce poten-
2 tial environmental impacts, including at the atmos-
3 pheric and subsurface level, associated with pipe-
4 lines, liquefied natural gas facilities, and gas and liq-
5 uid fuel storage facilities, such as equipment failure.

6 (12) Tools to evaluate geographical pipeline
7 data for the feasibility of repurposing existing infra-
8 structure for safe and effective transport and use of
9 alternative fuels, blends, and carbon dioxide.

10 (13) Tools and technologies applicable to im-
11 proving the safety, operation, and efficiency of lique-
12 fied natural gas facilities and gas and liquid fuel
13 storage facilities.

14 (c) SELECTION REQUIREMENTS.—In selecting eligi-
15 ble entities for demonstration projects under the Initiative,
16 the Secretary shall, to the maximum extent practicable,
17 take the following actions:

18 (1) Encourage regional diversity among eligible
19 entities, including participation by such entities lo-
20 cated in rural States.

21 (2) Prioritize technological diversity among eli-
22 gible entities.

23 (3) Prioritize a diverse mix of energy, sub-
24 stances, fuel sources, and byproducts, including the
25 following:

1 (A) Gas and liquid hydrocarbons, including
2 natural gas, methane, ethane, and liquefied nat-
3 ural gas.

4 (B) Carbon dioxide.

5 (C) Hydrogen.

6 (D) Biofuels.

7 (E) Water.

8 (F) Substances in the hydrogen supply
9 chain, including ammonia and liquid organic
10 hydrogen carriers.

11 (G) Blends of gases or liquids, including
12 hydrogen blends.

13 (H) Any other source the Secretary deter-
14 mines appropriate.

15 (4) Prioritize projects that leverage and are
16 complementary to existing energy infrastructure.

17 (5) Prioritize projects that leverage matching
18 funds from non-Federal sources.

19 (6) Ensure that selected projects are coordi-
20 nated with and expand on the existing technology
21 demonstration programs of the Department.

22 (7) Evaluate projects and topics for technical
23 performance and economic feasibility as part of
24 lifecycle assessments for return on investment im-
25 pact.

1 (d) LOCATION.—To the maximum extent practicable,
2 demonstration projects under the Initiative shall be lo-
3 cated on sites with existing research infrastructure or with
4 the ability to coordinate with existing Department user fa-
5 cilities and research centers.

6 **SEC. 5. JOINT RESEARCH AND DEVELOPMENT PROGRAM.**

7 (a) IN GENERAL.—The Secretary, in consultation
8 with the Secretary of Transportation and the Director of
9 the National Institute of Standards and Technology, and
10 in coordination with the Initiative, shall establish within
11 the Department a joint research and development program
12 (referred to in this Act as the “Joint Program”) to carry
13 out basic research projects that—

14 (1) develop cost effective advanced materials
15 and technologies for pipeline transportation systems
16 at different scales;

17 (2) enable the commercialization of innovative
18 materials and technologies for pipeline transpor-
19 tation systems; and

20 (3) are at a low technology readiness level and
21 not pursued by the Pipeline Safety Research Pro-
22 gram of the Pipeline and Hazardous Materials Safe-
23 ty Administration of the Department of Transpor-
24 tation.

1 (b) MEMORANDUM OF UNDERSTANDING.—Not later
2 than one year after the date of the enactment of this Act,
3 the Secretary shall enter into a memorandum of under-
4 standing with the Secretary of Transportation and the Di-
5 rector of the National Institute of Standards and Tech-
6 nology to administer the Joint Program. Such memo-
7 randum shall require each participating agency to—

8 (1) identify unique research capabilities to con-
9 tribute while avoiding duplication of existing efforts;
10 and

11 (2) include cost sharing and cost reimburse-
12 ment abilities among participating agencies.

13 (c) INFRASTRUCTURE.—In carrying out the Joint
14 Program, the Secretary, the Secretary of Transportation,
15 and the Director of the National Institute of Standards
16 and Technology shall—

17 (1) use existing research infrastructure at—

18 (A) Department of Energy facilities, in-
19 cluding National Laboratories;

20 (B) Department of Transportation initia-
21 tives, including any such initiatives carried out
22 through the Pipeline and Hazardous Materials
23 Safety Administration; and

24 (C) the National Institute of Standards
25 and Technology; and

1 (2) develop new infrastructure for potential
2 projects, if appropriate.

3 (d) GOALS AND METRICS.—The Secretary, the Sec-
4 retary of Transportation, and the Director of the National
5 Institute of Standards and Technology shall develop goals
6 and metrics for each agency in meeting technological
7 progress under the Joint Program, consistent with exist-
8 ing United States energy safety, resilience, and security
9 policies.

10 (e) SELECTION OF PROJECTS.—To the maximum ex-
11 tent practicable, the Secretary, the Secretary of Transpor-
12 tation, and the Director of the National Institute of
13 Standards and Technology shall ensure the following with
14 respect to the Joint Program:

15 (1) Projects are carried out under conditions
16 that represent a variety of geographies, physical con-
17 ditions, and market constraints.

18 (2) Projects represent an appropriate balance of
19 the following:

20 (A) Larger, higher-cost projects.

21 (B) Smaller, lower-cost projects.

22 (3) To the maximum extent practicable,
23 projects are transferred between participating agen-
24 cies based on the stage of research and capabilities
25 of each agency.

1 (f) PRIORITY.—In carrying out the Joint Program,
2 the Secretary, the Director of the National Institute of
3 Standards and Technology, and the Secretary of Trans-
4 portation shall, through consultation with the Initiative to
5 identify and advance areas of research most needed for
6 demonstration projects under the Initiative, give priority
7 to research and demonstration projects that—

8 (1) are likely to achieve technology readiness
9 level necessary to be expediently demonstrated by
10 the Initiative; and

11 (2) are done in coordination with, or advance
12 knowledge critical to, the Center established pursu-
13 ant to section 6.

14 **SEC. 6. NATIONAL PIPELINE MODERNIZATION CENTER.**

15 (a) IN GENERAL.—In carrying out the Initiative and
16 the Joint Program, the Secretary shall establish a Na-
17 tional Pipeline Modernization Center (referred to in this
18 Act as the “Center”), which shall focus on collaborating
19 with industry and stakeholders to coordinate and carry out
20 research, development, and demonstration projects fo-
21 cused on commercializing cost-effective products and pro-
22 cedures aligned with the goals and priorities set forth by
23 the Department.

24 (b) SELECTION.—The Secretary shall administer the
25 Center in conjunction with an eligible entity pursuant to

1 an agreement between the Department and such entity.
2 Such entity shall be selected on a competitive, merit-re-
3 viewed basis.

4 (c) EXISTING CENTERS.—In administering the Cen-
5 ter, the Secretary shall prioritize higher education energy-
6 related research centers in existence as of the date of the
7 enactment of this Act.

8 (d) PERIOD OF PERFORMANCE.—

9 (1) IN GENERAL.—An agreement under sub-
10 section (b) shall be for a period of not more than
11 five years, subject to the availability of appropria-
12 tions.

13 (2) RENEWAL.—The Secretary may renew an
14 agreement under subsection (b) for a period of not
15 more than five years. Any such renewal shall be con-
16 ducted on a merit-reviewed basis

17 (e) LOCATION.—The Center shall be located in prox-
18 imity to critical transportation infrastructure connecting
19 to an existing national pipeline transportation system and
20 other Department monitoring assets, as determined by the
21 Secretary.

22 (f) COORDINATION WITH TRAINING AND QUALIFICA-
23 TIONS CENTER.—In carrying out the functions described
24 in subsection (a), the Center shall coordinate and collabo-
25 rate with training centers of the Pipeline and Hazardous

1 Materials Safety Administration of the Department of
2 Transportation to facilitate knowledge sharing among,
3 and enhanced training opportunities for, Federal and
4 State pipeline safety inspectors and investigators.

5 **SEC. 7. AUTHORIZATION OF APPROPRIATIONS.**

6 There are authorized to be appropriated to the Sec-
7 retary to carry out this Act, to remain available until ex-
8 pended, the following:

9 (1) For activities under the Initiative,
10 \$50,000,000 for each of fiscal years 2023 through
11 2027.

12 (2) For the Joint Program, \$30,000,000 for
13 each of fiscal years 2023 through 2027.

14 (3) For the Center, \$15,000,000 for each of fis-
15 cal years 2023 through 2027.