

115TH CONGRESS
2D SESSION

S. 3422

To direct the Secretary of Energy to establish advanced nuclear goals, provide for a versatile, reactor-based fast neutron source, make available high-assay, low-enriched uranium for research, development, and demonstration of advanced nuclear reactor concepts, and for other purposes.

IN THE SENATE OF THE UNITED STATES

SEPTEMBER 6, 2018

Ms. MURKOWSKI (for herself, Mr. BOOKER, Mr. RISCH, Mr. CRAPO, Mrs. CAPITO, Mr. DURBIN, Mr. WHITEHOUSE, Mr. MANCHIN, and Mr. COONS) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

A BILL

To direct the Secretary of Energy to establish advanced nuclear goals, provide for a versatile, reactor-based fast neutron source, make available high-assay, low-enriched uranium for research, development, and demonstration of advanced nuclear reactor concepts, 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 “Nuclear Energy Lead-
5 ership Act”.

1 **SEC. 2. AUTHORIZATION OF LONG-TERM POWER PUR-**
2 **CHASE AGREEMENTS.**

3 Section 501(b)(1) of title 40, United States Code, is
4 amended by striking subparagraph (B) and inserting the
5 following:

6 “(B) PUBLIC UTILITY CONTRACTS.—

7 “(i) TERM.—

8 “(I) IN GENERAL.—A contract
9 under this paragraph to purchase
10 electricity from a public utility may be
11 for a period of not more than 40
12 years.

13 “(II) OTHER PUBLIC UTILITY
14 SERVICES.—A contract under this
15 paragraph for a public utility service
16 other than a service described in sub-
17 clause (I) may be for a period of not
18 more than 10 years.

19 “(ii) COSTS.—The cost of a contract
20 under this paragraph for any fiscal year
21 may be paid from the appropriations for
22 that fiscal year.”.

1 **SEC. 3. LONG-TERM NUCLEAR POWER PURCHASE AGREE-**
2 **MENT PILOT PROGRAM.**

3 (a) IN GENERAL.—Subtitle B of title VI of the En-
4 ergy Policy Act of 2005 (Public Law 109–58; 119 Stat.
5 782) is amended by adding at the end the following:

6 **“SEC. 640. LONG-TERM NUCLEAR POWER PURCHASE**
7 **AGREEMENT PILOT PROGRAM.**

8 “(a) ESTABLISHMENT.—The Secretary shall estab-
9 lish a pilot program for a long-term power purchase agree-
10 ment.

11 “(b) REQUIREMENTS.—In developing the pilot pro-
12 gram under this section, the Secretary shall—

13 “(1) consult and coordinate with the heads of
14 other Federal departments and agencies that may
15 benefit from purchasing nuclear power for a period
16 of longer than 10 years, including—

17 “(A) the Secretary of Defense; and

18 “(B) the Secretary of Homeland Security;

19 and

20 “(2) not later than December 31, 2023, enter
21 into at least 1 agreement to purchase power from a
22 commercial nuclear reactor.

23 “(c) FACTORS FOR CONSIDERATION.—

24 “(1) IN GENERAL.—In carrying out this sec-
25 tion, the Secretary shall give special consideration to
26 power purchase agreements for first-of-a-kind or

1 early deployment nuclear technologies that can pro-
 2 vide reliable and resilient power to high-value assets
 3 for national security purposes or other purposes as
 4 the Secretary determines to be in the national inter-
 5 est, especially in remote off-grid scenarios or grid-
 6 connected scenarios that can provide capabilities
 7 commonly known as ‘islanding power capabilities’
 8 during an emergency scenario.

9 “(2) EFFECT ON RATES.—An agreement to
 10 purchase power under this section may be at a rate
 11 that is higher than the average market rate, if the
 12 agreement fulfills an applicable consideration de-
 13 scribed in paragraph (1).”.

14 (b) TABLE OF CONTENTS.—The table of contents of
 15 the Energy Policy Act of 2005 (Public Law 109–58; 119
 16 Stat. 594) is amended by inserting after the item relating
 17 to section 639 the following:

“Sec. 640. Long-term nuclear power purchase agreement pilot program.”.

18 **SEC. 4. ADVANCED NUCLEAR REACTOR RESEARCH AND DE-**
 19 **VELOPMENT GOALS.**

20 (a) IN GENERAL.—Subtitle E of title IX of the En-
 21 ergy Policy Act of 2005 (42 U.S.C. 16271 et seq.) is
 22 amended by adding at the end the following:

23 **“SEC. 958. ADVANCED NUCLEAR REACTOR RESEARCH AND**
 24 **DEVELOPMENT GOALS.**

25 “(a) DEFINITIONS.—In this section:

1 “(1) ADVANCED NUCLEAR REACTOR.—The
2 term ‘advanced nuclear reactor’ means—

3 “(A) a nuclear fission reactor, including a
4 prototype plant (as defined in sections 50.2 and
5 52.1 of title 10, Code of Federal Regulations
6 (or successor regulations)), with significant im-
7 provements compared to the most recent gen-
8 eration of fission reactors, including improve-
9 ments such as—

10 “(i) additional inherent safety fea-
11 tures;

12 “(ii) lower waste yields;

13 “(iii) improved fuel performance;

14 “(iv) increased tolerance to loss of
15 fuel cooling;

16 “(v) enhanced reliability;

17 “(vi) increased proliferation resist-
18 ance;

19 “(vii) increased thermal efficiency;

20 “(viii) reduced consumption of cooling
21 water;

22 “(ix) the ability to integrate into elec-
23 tric applications and nonelectric applica-
24 tions;

1 “(x) modular sizes to allow for deploy-
2 ment that corresponds with the demand
3 for electricity; or

4 “(xi) operational flexibility to respond
5 to changes in demand for electricity and to
6 complement integration with intermittent
7 renewable energy; and

8 “(B) a fusion reactor.

9 “(2) DEMONSTRATION PROJECT.—The term
10 ‘demonstration project’ means an advanced nuclear
11 reactor operated—

12 “(A) as part of the power generation facili-
13 ties of an electric utility system; or

14 “(B) in any other manner for the purpose
15 of demonstrating the suitability for commercial
16 application of the advanced nuclear reactor.

17 “(b) PURPOSE.—The purpose of this section is to di-
18 rect the Secretary, as soon as practicable after the date
19 of enactment of this section, to advance the research and
20 development of domestic advanced, affordable, and clean
21 nuclear energy by—

22 “(1) demonstrating different advanced nuclear
23 reactor technologies that could be used by the pri-
24 vate sector to produce—

1 “(A) emission-free power at a levelized cost
2 of electricity of \$60 per megawatt-hour or less;

3 “(B) heat for community heating, indus-
4 trial purposes, or synthetic fuel production;

5 “(C) remote or off-grid energy supply; or

6 “(D) backup or mission-critical power sup-
7 plies;

8 “(2) developing goals for nuclear energy re-
9 search programs that would accomplish the goals of
10 the demonstration projects carried out under sub-
11 section (c);

12 “(3) identifying research areas that the private
13 sector is unable or unwilling to undertake due to the
14 cost of, or risks associated with, the research; and

15 “(4) facilitating the access of the private sec-
16 tor—

17 “(A) to Federal research facilities; and

18 “(B) to the results of research funded by
19 the Federal Government.

20 “(c) DEMONSTRATION PROJECTS.—

21 “(1) IN GENERAL.—During the period begin-
22 ning on the date of enactment of this section and
23 ending on September 30, 2028, the Secretary shall,
24 to the maximum extent practicable, enter into 1 or

1 more agreements to carry out not fewer than 4 ad-
2 vanced nuclear reactor demonstration projects.

3 “(2) REQUIREMENTS.—In carrying out dem-
4 onstration projects under paragraph (1), the Sec-
5 retary shall—

6 “(A) seek to include diversity in designs
7 for the advanced nuclear reactors demonstrated
8 under this section, including designs using var-
9 ious primary coolants;

10 “(B) seek to ensure that—

11 “(i) the long-term cost of electricity or
12 heat for each design to be demonstrated
13 under this subsection is cost-competitive in
14 the applicable market; and

15 “(ii) the cost-competitiveness of each
16 design to be demonstrated under this sub-
17 section is verified by an external review of
18 the proposed design;

19 “(C) enter into cost-sharing agreements
20 with partners in accordance with section 988
21 for the conduct of activities relating to the re-
22 search, development, and demonstration of pri-
23 vate-sector advanced nuclear reactor designs
24 under the program;

1 “(D) work with private sector partners to
2 identify potential sites, including Department-
3 owned sites, for demonstrations, as appropriate;
4 and

5 “(E) align specific activities carried out
6 under demonstration projects carried out under
7 this subsection with priorities identified through
8 direct consultations between—

9 “(i) the Department;

10 “(ii) National Laboratories;

11 “(iii) institutions of higher education
12 (as defined in section 101(a) of the Higher
13 Education Act of 1965 (20 U.S.C.
14 1001(a)));

15 “(iv) traditional end-users (such as
16 electric utilities);

17 “(v) potential end-users of new tech-
18 nologies (such as petrochemical compa-
19 nies); and

20 “(vi) developers of advanced nuclear
21 reactor technology.

22 “(d) GOALS.—

23 “(1) IN GENERAL.—The Secretary shall estab-
24 lish goals for research relating to advanced nuclear
25 reactors facilitated by the Department that support

1 the objectives of the program for demonstration
2 projects established under subsection (c).

3 “(2) COORDINATION.—In developing the goals
4 under paragraph (1), the Secretary shall coordinate,
5 on an ongoing basis, with members of private indus-
6 try to advance the demonstration of various designs
7 of advanced nuclear reactors.

8 “(3) REQUIREMENTS.—In developing the goals
9 under paragraph (1), the Secretary shall ensure
10 that—

11 “(A) research activities facilitated by the
12 Department to meet the goals developed under
13 this subsection are focused on key areas of nu-
14 clear research and deployment ranging from
15 basic energy to full-design development, safety
16 evaluation, and licensing;

17 “(B) research programs designed to meet
18 the goals emphasize—

19 “(i) resolving materials challenges re-
20 lating to radiation damage or corrosive
21 coolants; and

22 “(ii) qualification of advanced fuels;

23 “(C) activities are carried out that address
24 near-term challenges in modeling and simula-
25 tion to enable accelerated design and licensing;

1 “(D) related technologies, such as electro-
2 chemical processing or fuel recycling that could
3 reduce nuclear waste volumes or half lives, are
4 developed;

5 “(E) infrastructure, such as a versatile
6 fast neutron source or molten salt testing facil-
7 ity, to aid in research are constructed;

8 “(F) basic knowledge of non-light water
9 coolant physics and chemistry is improved; and

10 “(G) advanced manufacturing and con-
11 struction techniques and materials are inves-
12 tigated to reduce the commercialization cost of
13 advanced nuclear reactors.”.

14 (b) TABLE OF CONTENTS.—The table of contents of
15 the Energy Policy Act of 2005 (Public Law 109–58; 119
16 Stat. 594) is amended—

17 (1) in the item relating to section 917, by strik-
18 ing “Efficiency”; and

19 (2) by inserting after the item relating to sec-
20 tion 957 the following:

“Sec. 958. Advanced nuclear reactor research and development goals.”.

21 **SEC. 5. NUCLEAR ENERGY STRATEGIC PLAN.**

22 (a) IN GENERAL.—Subtitle E of title IX of the En-
23 ergy Policy Act of 2005 (42 U.S.C. 16271 et seq.) (as
24 amended by section 4(a)) is amended by adding at the
25 end the following:

1 **“SEC. 958A. NUCLEAR ENERGY STRATEGIC PLAN.**

2 “(a) IN GENERAL.—Not later than 180 days after
3 the date of enactment of this section, the Secretary shall
4 submit to the Committee on Energy and Natural Re-
5 sources of the Senate and the Committees on Energy and
6 Commerce and Science, Space, and Technology of the
7 House of Representatives a 10-year strategic plan for the
8 Office of Nuclear Energy of the Department, in accord-
9 ance with this section.

10 “(b) REQUIREMENTS.—

11 “(1) COMPONENTS.—The strategic plan under
12 this section shall designate—

13 “(A) programs that support the planned
14 accomplishment of the goals established under
15 section 958(d); and

16 “(B) programs that—

17 “(i) do not support the planned ac-
18 complishment of the goals referred to in
19 subparagraph (A); but

20 “(ii) are important to the mission of
21 the Office of Nuclear Energy, as deter-
22 mined by the Secretary.

23 “(2) PROGRAM PLANNING.—In developing the
24 strategic plan under this section, the Secretary shall
25 specify expected timelines for, as applicable—

1 “(A) the accomplishment of relevant objec-
 2 tives under current programs of the Depart-
 3 ment; or

4 “(B) the commencement of new programs
 5 to accomplish those objectives.

6 “(c) UPDATES.—Not less frequently than once every
 7 2 years, the Secretary shall submit to the Committee on
 8 Energy and Natural Resources of the Senate and the
 9 Committees on Energy and Commerce and Science, Space,
 10 and Technology of the House of Representatives an up-
 11 dated 10-year strategic plan in accordance with subsection
 12 (b), which shall identify, and provide a justification for,
 13 any major deviation from a previous strategic plan sub-
 14 mitted under this section.”.

15 (b) TABLE OF CONTENTS.—The table of contents of
 16 the Energy Policy Act of 2005 (Public Law 109–58; 119
 17 Stat. 594) (as amended by section 4(b)(2)) is amended
 18 by inserting after the item relating to section 958 the fol-
 19 lowing:

“Sec. 958A. Nuclear energy strategic plan.”.

20 **SEC. 6. VERSATILE, REACTOR-BASED FAST NEUTRON**
 21 **SOURCE.**

22 (a) IN GENERAL.—Subtitle E of title IX of the En-
 23 ergy Policy Act of 2005 (42 U.S.C. 16271 et seq.) (as
 24 amended by section 5(a)) is amended by adding at the
 25 end the following:

1 **“SEC. 959. VERSATILE, REACTOR-BASED FAST NEUTRON**
2 **SOURCE.**

3 “(a) DEFINITION OF FAST NEUTRON.—In this sec-
4 tion, the term ‘fast neutron’ means a neutron with kinetic
5 energy above 100 kiloelectron volts.

6 “(b) REQUIREMENT.—The Secretary shall provide
7 for a versatile, reactor-based fast neutron source, which
8 shall operate as a national user facility.

9 “(c) CONSULTATIONS REQUIRED.—In carrying out
10 subsection (b), the Secretary shall consult with the private
11 sector, institutions of higher education (as defined in sec-
12 tion 101(a) of the Higher Education Act of 1965 (20
13 U.S.C. 1001(a))), the National Laboratories, and relevant
14 Federal agencies to ensure that the neutron source estab-
15 lished under subsection (b) is capable of meeting Federal
16 research needs for neutron irradiation services.

17 “(d) FACILITY CAPABILITIES.—

18 “(1) CAPABILITIES.—The Secretary shall en-
19 sure that the user facility described in subsection (b)
20 will provide, at a minimum—

21 “(A) fast neutron spectrum irradiation ca-
22 pability; and

23 “(B) the capacity for upgrades to accom-
24 modate new or expanded research needs.

25 “(2) CONSIDERATIONS.—In carrying out para-
26 graph (1), the Secretary shall consider—

1 “(A) capabilities that support experimental
2 high-temperature testing;

3 “(B) providing a source of fast neutrons—
4 “(i) at a neutron flux higher than that
5 at which existing research facilities oper-
6 ate; and

7 “(ii) sufficient to enable research for
8 an optimal base of prospective users;

9 “(C) maximizing irradiation flexibility and
10 irradiation volume to accommodate as many
11 concurrent users as practicable;

12 “(D) capabilities for irradiation with neu-
13 trons of a lower energy spectrum;

14 “(E) multiple loops for fuels and materials
15 testing of different coolants;

16 “(F) additional pre- and post-irradiation
17 examination capabilities; and

18 “(G) lifetime operating costs and lifecycle
19 costs.

20 “(e) DEADLINE FOR COMMENCEMENT OF OPER-
21 ATIONS.—To the maximum extent practicable, the Sec-
22 retary shall ensure that full operations at the user facility
23 under subsection (b) commence before December 31,
24 2025.

1 “(f) FUNDING.—Of the funds appropriated to the Of-
 2 fice of Nuclear Energy of the Department, the Secretary
 3 shall use such sums as are necessary to carry out this sec-
 4 tion.”.

5 (b) TABLE OF CONTENTS.—The table of contents of
 6 the Energy Policy Act of 2005 (Public Law 109–58; 119
 7 Stat. 594) (as amended by section 5(b)) is amended by
 8 inserting after the item relating to section 958A the fol-
 9 lowing:

“Sec. 959. Versatile, reactor-based fast neutron source.”.

10 **SEC. 7. ADVANCED NUCLEAR FUEL SECURITY PROGRAM.**

11 (a) FINDINGS.—Congress finds that—

12 (1) the national security nuclear enterprise,
 13 which supports the nuclear weapons stockpile stew-
 14 ardship and naval reactors functions of the National
 15 Nuclear Security Administration, requires a domes-
 16 tic fuel cycle, including uranium mining, uranium
 17 processing, uranium enrichment, and fuel fabrica-
 18 tion, capable of producing low- and high-enriched
 19 uranium;

20 (2) many domestic advanced nuclear power in-
 21 dustry participants require access to high-assay, low-
 22 enriched uranium fuel for—

23 (A) initial fuel testing;

24 (B) operation of demonstration reactors;

25 and

1 (C) commercial operation of advanced nu-
2 clear reactors;

3 (3) as of the date of enactment of this Act, no
4 domestic uranium enrichment or fuel fabrication ca-
5 pability exists for uranium fuel enriched to greater
6 than 5 weight percent of the uranium-235 isotope;

7 (4) a healthy commercial nuclear fuel cycle ca-
8 pable of providing higher levels of enriched uranium
9 would benefit—

10 (A) the relevant national security functions
11 of the National Nuclear Security Administra-
12 tion; and

13 (B) the domestic advanced nuclear indus-
14 try of the United States; and

15 (5) making limited quantities of high-assay,
16 low-enriched uranium available from Department of
17 Energy stockpiles of uranium would allow for initial
18 fuel testing and demonstration of advanced nuclear
19 reactor concepts, accelerating—

20 (A) the path to market of those concepts;
21 and

22 (B) the development of—

23 (i) a market for advanced nuclear re-
24 actors; and

1 (ii) a resulting growing commercial
2 nuclear fuel cycle capability.

3 (b) AMENDMENT.—

4 (1) IN GENERAL.—Subtitle E of title IX of the
5 Energy Policy Act of 2005 (42 U.S.C. 16271 et
6 seq.) (as amended by section 6(a)) is amended by
7 adding at the end the following:

8 **“SEC. 960. ADVANCED NUCLEAR FUEL SECURITY PRO-**
9 **GRAM.**

10 “(a) DEFINITIONS.—In this section:

11 “(1) HIGH-ASSAY, LOW-ENRICHED URANIUM.—
12 The term ‘high-assay, low-enriched uranium’ means
13 uranium with an assay greater than 5 weight per-
14 cent, but less than 20 weight percent, of the ura-
15 nium-235 isotope.

16 “(2) HIGH-ENRICHED URANIUM.—The term
17 ‘high-enriched uranium’ means uranium with an
18 assay of 20 weight percent or more of the uranium-
19 235 isotope.

20 “(b) HIGH-ASSAY LOW-ENRICHED URANIUM PRO-
21 GRAM FOR ADVANCED REACTORS.—

22 “(1) ESTABLISHMENT.—Not later than 1 year
23 after the date of enactment of this section, the Sec-
24 retary shall establish a program to make available
25 high-assay, low-enriched uranium, through contracts

1 for sale, resale, transfer, or lease, for use in com-
2 mercial or noncommercial advanced nuclear reactors.

3 “(2) NUCLEAR FUEL OWNERSHIP.—Each lease
4 under this subsection shall include a provision estab-
5 lishing that the nuclear fuel that is the subject of
6 the lease shall remain the property of the Depart-
7 ment, including with respect to responsibility for the
8 final disposition of all radioactive waste created by
9 the irradiation, processing, or purification of any
10 leased uranium.

11 “(3) QUANTITY.—In carrying out the program
12 under this subsection, the Secretary shall make
13 available—

14 “(A) by December 31, 2022, high-assay,
15 low-enriched uranium containing not less than
16 2 metric tons of the uranium-235 isotope; and

17 “(B) by December 31, 2025, high-assay,
18 low-enriched uranium containing not less than
19 10 metric tons of the uranium-235 isotope (as
20 determined including the quantities of the ura-
21 nium-235 isotope made available before Decem-
22 ber 31, 2022).

23 “(4) FACTORS FOR CONSIDERATION.—In car-
24 rying out the program under this subsection, the
25 Secretary shall take into consideration options for

1 providing the high-assay, low-enriched uranium
2 under this subsection from a stockpile of uranium
3 owned by the Department (including the National
4 Nuclear Security Administration), including—

5 “(A) fuel that—

6 “(i) directly meets the needs of an
7 end-user; but

8 “(ii) has been previously used or fab-
9 ricated for another purpose;

10 “(B) fuel that can meet the needs of an
11 end-user after removing radioactive or other
12 contaminants that resulted from a previous use
13 or fabrication of the fuel for research, develop-
14 ment, demonstration, or deployment activities
15 of the Department (including activities of the
16 National Nuclear Security Administration); and

17 “(C) fuel from a high-enriched uranium
18 stockpile, which can be blended with lower-
19 assay uranium to become high-assay, low-en-
20 riched uranium to meet the needs of an end-
21 user.

22 “(5) LIMITATION.—The Secretary shall not
23 barter or otherwise sell or transfer uranium in any
24 form in exchange for services relating to the final

1 disposition of radioactive waste from uranium that is
2 the subject of a lease under this subsection.

3 “(6) SUNSET.—The program under this sub-
4 section shall terminate on the earlier of—

5 “(A) January 1, 2035; and

6 “(B) the date on which uranium enriched
7 up to, but not equal to, 20 weight percent can
8 be obtained in the commercial market from do-
9 mestic suppliers.

10 “(c) REPORT.—

11 “(1) IN GENERAL.—Not later than 180 days
12 after the date of enactment of this section, the Sec-
13 retary shall submit to the appropriate committees of
14 Congress a report that describes actions proposed to
15 be carried out by the Secretary—

16 “(A) under the program under subsection
17 (b); or

18 “(B) otherwise to enable the commercial
19 use of high-assay, low-enriched uranium.

20 “(2) COORDINATION AND STAKEHOLDER
21 INPUT.—In developing the report under this sub-
22 section, the Secretary shall seek input from—

23 “(A) the Nuclear Regulatory Commission;

24 “(B) the National Laboratories;

1 “(C) institutions of higher education (as
2 defined in section 101(a) of the Higher Edu-
3 cation Act of 1965 (20 U.S.C. 1001(a)));

4 “(D) a diverse group of entities operating
5 in the nuclear energy industry; and

6 “(E) a diverse group of technology devel-
7 opers.

8 “(3) COST AND SCHEDULE ESTIMATES.—The
9 report under this subsection shall include estimated
10 costs, budgets, and timeframes for enabling the use
11 of high-assay, low-enriched uranium.

12 “(4) REQUIRED EVALUATIONS.—The report
13 under this subsection shall evaluate—

14 “(A) the costs and actions required to es-
15 tablish and carry out the program under sub-
16 section (b), including with respect to—

17 “(i) proposed preliminary terms for
18 the sale, resale, transfer, and leasing of
19 high-assay low-enriched uranium (including
20 guidelines defining the roles and respon-
21 sibilities between the Department and the
22 purchaser, transfer recipient, or lessee);
23 and

1 “(ii) the potential to coordinate with
2 purchasers, transfer recipients, and lessees
3 regarding—

4 “(I) fuel fabrication; and

5 “(II) fuel transport;

6 “(B) the potential sources and fuel forms
7 available to provide uranium for the program
8 under subsection (b);

9 “(C) options to coordinate the program
10 under subsection (b) with the operation of the
11 versatile, reactor-based fast neutron source
12 under section 959;

13 “(D) the ability of the domestic uranium
14 market to provide materials for advanced nu-
15 clear reactor fuel; and

16 “(E) any associated legal, regulatory, and
17 policy issues that should be addressed to en-
18 able—

19 “(i) the program under subsection (b);

20 and

21 “(ii) the establishment of a domestic
22 industry capable of providing high-assay,
23 low-enriched uranium for commercial and
24 noncommercial purposes, including with re-
25 spect to the needs of—

1 “(I) the Department;
2 “(II) the Department of Defense;
3 and
4 “(III) the National Nuclear Se-
5 curity Administration.”.

6 (2) TABLE OF CONTENTS.—The table of con-
7 tents of the Energy Policy Act of 2005 (Public Law
8 109–58; 119 Stat. 594) (as amended by section
9 6(b)) is amended by inserting after the item relating
10 to section 959 the following:

“Sec. 960. Advanced nuclear fuel security program.”.

11 **SEC. 8. UNIVERSITY NUCLEAR LEADERSHIP PROGRAM.**

12 (a) FINDINGS.—Congress finds that—

13 (1) nuclear power plants—

14 (A) generate billions of dollars in national
15 economic activity through procurements
16 throughout the United States; and

17 (B) provide tens of thousands of people in
18 the United States with high-paying jobs, con-
19 tributing substantially to the local economies of
20 the communities in which the plants operate;

21 (2) the world market for the growth of commer-
22 cial nuclear power was estimated by the Department
23 of Commerce to be valued at up to
24 \$740,000,000,000 during the period of calendar
25 years 2018 through 2028;

1 (3) the participation and leadership of the
2 United States in the market described in paragraph
3 (2) will—

4 (A)(i) increase economic activity in the
5 United States through robust nuclear exports,
6 leading to the enhanced economic security of
7 the United States; and

8 (ii) preserve and enhance the ability of the
9 United States to positively influence inter-
10 national nuclear safety, security, and non-
11 proliferation standards through commercial en-
12 gagement with other nations; but

13 (B) require significant investment in
14 United States-origin advanced nuclear tech-
15 nologies;

16 (4) in order to lead the world in the next gen-
17 eration of commercial nuclear power, the advanced
18 nuclear industry in the United States should be posi-
19 tioned for accelerated growth, which requires public-
20 private partnerships with—

21 (A) the Department of Energy;

22 (B) the National Nuclear Security Admin-
23 istration; and

24 (C) the Nuclear Regulatory Commission;

1 (5) advanced reactors represent new challenges
2 in reactor design, safeguards, and regulation;

3 (6) the challenges referred to in paragraph
4 (5)—

5 (A) are directly relevant to the missions
6 of—

7 (i) the Office of Nuclear Energy of
8 the Department of Energy;

9 (ii) the National Nuclear Security Ad-
10 ministration; and

11 (iii) the Nuclear Regulatory Commis-
12 sion; and

13 (B) require a highly skilled workforce in
14 order to be met; and

15 (7) nuclear science and engineering programs
16 at institutions of higher education in the United
17 States—

18 (A) annually award degrees in nuclear en-
19 gineering and related fields to more than 600
20 undergraduate students, and 500 graduate stu-
21 dents, who are critical to maintaining United
22 States leadership in the development of ad-
23 vanced nuclear systems;

24 (B) perform cutting-edge research and
25 technology development activities that have

1 made fundamental contributions to advancing
2 United States nuclear technology;

3 (C) support workforce development critical
4 to maintaining United States leadership in nu-
5 clear detection, nonproliferation, nuclear medi-
6 cine, advanced manufacturing, and other non-
7 energy areas; and

8 (D) generally do not receive support from
9 Federal science agencies other than the Depart-
10 ment of Energy.

11 (b) AMENDMENT.—Section 313 of the Energy and
12 Water Development and Related Agencies Appropriations
13 Act, 2009 (42 U.S.C. 16274a), is amended to read as fol-
14 lows:

15 **“SEC. 313. UNIVERSITY NUCLEAR LEADERSHIP PROGRAM.**

16 “(a) DEFINITIONS.—In this section:

17 “(1) ADVANCED NUCLEAR REACTOR.—The
18 term ‘advanced nuclear reactor’ means—

19 “(A) a nuclear fission reactor, including a
20 prototype plant (as defined in sections 50.2 and
21 52.1 of title 10, Code of Federal Regulations
22 (or successor regulations)), with significant im-
23 provements compared to the most recent gen-
24 eration of fission reactors, including improve-
25 ments such as—

- 1 “(i) additional inherent safety fea-
2 tures;
3 “(ii) lower waste yields;
4 “(iii) improved fuel performance;
5 “(iv) increased tolerance to loss of
6 fuel cooling;
7 “(v) enhanced reliability;
8 “(vi) increased proliferation resist-
9 ance;
10 “(vii) increased thermal efficiency;
11 “(viii) reduced consumption of cooling
12 water;
13 “(ix) the ability to integrate into elec-
14 tric applications and nonelectric applica-
15 tions;
16 “(x) modular sizes to allow for deploy-
17 ment that corresponds with the demand
18 for electricity; or
19 “(xi) operational flexibility to respond
20 to changes in demand for electricity and to
21 complement integration with intermittent
22 renewable energy; and
23 “(B) a fusion reactor.

24 “(2) INSTITUTION OF HIGHER EDUCATION.—
25 The term ‘institution of higher education’ has the

1 meaning given the term in section 101(a) of the
2 Higher Education Act of 1965 (20 U.S.C. 1001(a)).

3 “(3) PROGRAM.—The term ‘Program’ means
4 the University Nuclear Leadership Program estab-
5 lished under subsection (b).

6 “(b) ESTABLISHMENT.—The Secretary of Energy,
7 the Administrator of the National Nuclear Security Ad-
8 ministration, and the Chairman of the Nuclear Regulatory
9 Commission shall jointly establish a program, to be known
10 as the ‘University Nuclear Leadership Program’.

11 “(c) USE OF FUNDS.—

12 “(1) IN GENERAL.—Except as provided in para-
13 graph (2), amounts made available to carry out the
14 Program shall be used to provide financial assistance
15 for scholarships, fellowships, and research and devel-
16 opment projects at institutions of higher education
17 in areas relevant to the programmatic mission of the
18 applicable Federal agency providing the financial as-
19 sistance with respect to research, development, dem-
20 onstration, and deployment activities for technologies
21 relevant to advanced nuclear reactors, including rel-
22 evant fuel cycle technologies.

23 “(2) EXCEPTION.—Notwithstanding paragraph
24 (1), amounts made available to carry out the Pro-
25 gram may be used to provide financial assistance for

1 a scholarship, fellowship, or multiyear research and
2 development project that does not align directly with
3 a programmatic mission of the applicable Federal
4 agency providing the financial assistance, if the ac-
5 tivity for which assistance is provided would facili-
6 tate the maintenance of the discipline of nuclear
7 science or nuclear engineering.

8 “(d) AUTHORIZATION OF APPROPRIATIONS.—There
9 are authorized to be appropriated such sums as are nec-
10 essary to carry out the Program.”.

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