

115TH CONGRESS  
1ST SESSION

# S. 1875

To move the United States toward greater energy independence and security, to increase the flexibility, efficiency, and reliability of the electric grid, to increase the competitiveness of the United States economy, to protect consumers, and to improve the energy performance of the Federal Government, and for other purposes.

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## IN THE SENATE OF THE UNITED STATES

SEPTEMBER 27, 2017

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

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## A BILL

To move the United States toward greater energy independence and security, to increase the flexibility, efficiency, and reliability of the electric grid, to increase the competitiveness of the United States economy, to protect consumers, and to improve the energy performance of the Federal Government, 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; TABLE OF CONTENTS.**

4 (a) SHORT TITLE.—This Act may be cited as the  
5 “Flexible Grid Infrastructure Act of 2017”.

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

- Sec. 1. Short title; table of contents.
- Sec. 2. Definitions.
- Sec. 3. Analysis of distributed energy resources, the value of grid services, and  
 advanced transmission assets.
- Sec. 4. Electrification of vehicles and heating.
- Sec. 5. Privacy, security, and resilience.
- Sec. 6. Workforce development.
- Sec. 7. Flexible Grid Challenge 2022.

3 **SEC. 2. DEFINITIONS.**

4 In this Act:

5 (1) ADMINISTRATOR.—The term “Adminis-  
 6 trator” means the Administrator of the Energy In-  
 7 formation Administration.

8 (2) COMMISSION.—The term “Commission”  
 9 means the Federal Energy Regulatory Commission.

10 (3) DISTRIBUTED ENERGY RESOURCE.—

11 (A) IN GENERAL.—The term “distributed  
 12 energy resource” means an electric device that  
 13 can produce or consume energy that is lo-  
 14 cated—

15 (i) on the distribution system or any  
 16 subsystem of the distribution system; or

17 (ii) behind a customer meter.

18 (B) INCLUSIONS.—The term “distributed  
 19 energy resource” includes—

20 (i) an energy storage resource;

21 (ii) an energy generation technology;

- 1 (iii) a demand response resource;
- 2 (iv) an energy efficiency resource;
- 3 (v) an electric vehicle and associated
- 4 supply equipment and systems; and
- 5 (vi) aggregations and integrated con-
- 6 trol systems, including virtual power
- 7 plants, microgrids, and networks of
- 8 microgrid cells.

9 (4) ELECTRIC CONSUMER; ELECTRIC UTILITY;  
 10 RATE.—The terms “electric consumer”, “electric  
 11 utility”, and “rate” have the meanings given the  
 12 terms in section 3 of the Public Utility Regulatory  
 13 Policies Act of 1978 (16 U.S.C. 2602).

14 (5) ELECTRIC RELIABILITY ORGANIZATION.—  
 15 The term “Electric Reliability Organization” has the  
 16 meaning given the term in section 215(a) of the  
 17 Federal Power Act (16 U.S.C. 824o(a)).

18 (6) ENERGY STORAGE.—The term “energy  
 19 storage” means equipment or facilities capable of  
 20 absorbing energy, storing energy for a period of  
 21 time, and dispatching the stored energy, that—

22 (A) uses mechanical, electrochemical, hy-

23 droelectric, or thermal processes, as a single fa-

24 cility or as an aggregation of units, throughout

25 the electric grid, including behind the meter to

1 store energy generated at one time for use at  
 2 a later time;

3 (B) uses mechanical, electrochemical, hy-  
 4 droelectric, or thermal processes, as a single fa-  
 5 cility or as an aggregation of units, throughout  
 6 the electric grid, including behind the meter to  
 7 store energy generated from mechanical proc-  
 8 esses that would otherwise be wasted for deliv-  
 9 ery at a later time; or

10 (C) stores thermal energy for direct use for  
 11 heating or cooling at a later time in a manner  
 12 that avoids the need to use electricity at that  
 13 later time.

14 (7) GRANULAR.—The term “granular”, with re-  
 15 spect to a rate or other price for electricity, means  
 16 that the rate or price is established based on precise  
 17 accounting of the value, as determined by the time  
 18 and location of the production or consumption of the  
 19 electricity and the unique type of energy services  
 20 being provided, of electrical energy, capacity, and  
 21 ancillary services, including—

22 (A) time-of-use rates;

23 (B) peak-time rebates;

24 (C) critical peak pricing;

25 (D) real-time pricing;

- 1 (E) transactive energy approaches;
- 2 (F) inverted time-of-use rates;
- 3 (G) forward-looking charges;
- 4 (H) peak-coincident capacity network
- 5 charges; and
- 6 (I) 3-part rates.

7 (8) LIGHT-DUTY CONSUMER VEHICLE.—The  
8 term “light-duty consumer vehicle” has the meaning  
9 given the term “light-duty vehicle” in section  
10 1037.801 of title 40, Code of Federal Regulations  
11 (as in effect on the date of enactment of this Act).

12 (9) LOCATIONAL VALUE.—The term “locational  
13 value”, with respect to an electric grid service,  
14 means value that is contingent on the physical loca-  
15 tion where the electric grid service is delivered.

16 (10) MICROGRID.—The term “microgrid”  
17 means a localized grid that can disconnect from the  
18 traditional grid to operate autonomously and help  
19 mitigate grid disturbances to strengthen grid resil-  
20 ience.

21 (11) NATIONAL LABORATORY.—The term “Na-  
22 tional Laboratory” has the meaning given the term  
23 in section 2 of the Energy Policy Act of 2005 (42  
24 U.S.C. 15801).

1           (12) SECRETARY.—The term “Secretary”  
2 means the Secretary of Energy.

3           (13) STATE ENERGY OFFICE.—The term “State  
4 energy office” has the meaning given the term in  
5 section 124(a) of the Energy Policy Act of 2005 (42  
6 U.S.C. 15821(a)).

7           (14) TEMPORAL VALUE.—The term “temporal  
8 value”, with respect to an electric grid service,  
9 means value that is contingent on the time when the  
10 electric grid service is delivered.

11          (15) TRANSIT AGENCY.—The term “transit  
12 agency” has the meaning given the term in section  
13 630.3 of title 49, Code of Federal Regulations (as  
14 in effect on the date of enactment of this Act).

15          (16) TRANSIT VEHICLE.—The term “transit ve-  
16 hicle” has the meaning given the term “bus” in sec-  
17 tion 1192.3 of title 36, Code of Federal Regulations  
18 (as in effect on the date of enactment of this Act).

19 **SEC. 3. ANALYSIS OF DISTRIBUTED ENERGY RESOURCES,**  
20 **THE VALUE OF GRID SERVICES, AND AD-**  
21 **VANCED TRANSMISSION ASSETS.**

22          (a) DATA AND ANALYSIS FOR PROMOTING GRID  
23 FLEXIBILITY AND OPTIMIZING DISTRIBUTED ENERGY  
24 RESOURCES.—Section 921 of the Energy Policy Act of  
25 2005 (42 U.S.C. 16211) is amended—

(1) by redesignating subsections (c) and (d) as paragraphs (3) and (4), respectively, of subsection (b) and indenting the paragraphs appropriately;

(2) in subsection (b)—

(A) in paragraph (1), in the matter preceding subparagraph (A), by inserting “resource” after “carry out distributed energy”;

(B) in paragraph (2), by striking “subsection” and inserting “section”; and

(C) in paragraphs (3) and (4) (as redesignated by paragraph (1)), by striking “subsection (b)” each place it appears and inserting “this subsection”;

(3) by redesignating subsection (b) as subsection (h);

(4) in subsection (a), by striking the subsection designation and heading and all that follows through “The Secretary” in the first sentence and inserting the following:

“(a) DEFINITIONS.—In this section:

“(1) COMMISSION.—The term ‘Commission’ means the Federal Energy Regulatory Commission.

“(2) DISTRIBUTED ENERGY RESOURCE.—The term ‘distributed energy resource’ has the meaning

given the term in section 2 of the Flexible Grid Infrastructure Act of 2017.

“(3) GRID FLEXIBILITY.—The term ‘grid flexibility’ means the ability of a power system—

“(A) from an operational perspective, to respond to changes in supply and demand, such as abrupt changes in load conditions or sharp ramps in generation; and

“(B) from a long-term planning and investment perspective, to respond to changes in technology, markets and policy, without incurring stranded assets.

“(b) RESEARCH, DEVELOPMENT, DEMONSTRATION, AND COMMERCIAL APPLICATION.—

“(1) IN GENERAL.—The Secretary”;

(5) in subsection (b) (as so redesignated), in the second sentence, by striking “The programs” and inserting the following:

“(2) REQUIREMENT.—The programs under this subsection”; and

(6) by inserting after subsection (b) (as so redesignated) the following:

“(c) NATIONAL ASSESSMENT OF THE POTENTIAL OF DISTRIBUTED ENERGY RESOURCES.—

“(1) ASSESSMENTS.—



1           “(A) IN GENERAL.—Not later than 1 year  
2           after the date of enactment of the Flexible Grid  
3           Infrastructure Act of 2017, and not less fre-  
4           quently than once every 3 years thereafter, the  
5           Commission and the Secretary shall conduct a  
6           national assessment of the technical and eco-  
7           nomic potential of distributed energy resources  
8           to provide electric grid services, including serv-  
9           ices that enhance grid flexibility and the reli-  
10          ability, resilience, affordability, efficiency, and  
11          security of the electric grid.

12          “(B) REQUIREMENTS.—In conducting an  
13          assessment under subparagraph (A), the Com-  
14          mission and the Secretary shall—

15               “(i) consider locational characteristics,  
16               such as load pockets and electric grid con-  
17               gestion;

18               “(ii) consider temporal characteristics,  
19               such as hourly and subhourly electricity  
20               generation costs and electricity network  
21               costs;

22               “(iii) consider the specific electric grid  
23               services identified by the study under sec-  
24               tion 3(b) of the Flexible Grid Infrastruc-  
25               ture Act of 2017;

1 “(iv) consider unique State regulatory  
2 and market characteristics and regional  
3 electric grid characteristics;

4 “(v) incorporate a range of scenarios,  
5 including scenarios that assume—

6 “(I) the existence of granular re-  
7 tail electricity rates, including  
8 transactive energy approaches;

9 “(II) no granular retail electricity  
10 rates;

11 “(III) the existence of electricity  
12 market products that remunerate the  
13 electric grid services provided by dis-  
14 tributed energy resources, incor-  
15 porating the results of the most recent  
16 study under section 3(b) of the Flexi-  
17 ble Grid Infrastructure Act of 2017;

18 “(IV) no electricity market prod-  
19 ucts that remunerate the electric grid  
20 services provided by distributed en-  
21 ergy resources, incorporating the re-  
22 sults of the most recent study under  
23 section 3(b) of the Flexible Grid In-  
24 frastructure Act of 2017;

1 “(V) various levels of renewable  
2 energy generation penetration;

3 “(VI) various levels of distributed  
4 energy resource penetration, including  
5 electric vehicles;

6 “(VII) the implementation of  
7 transactive energy approaches as a  
8 means of coordinating at scale large  
9 numbers of distributed energy re-  
10 sources; and

11 “(VIII) different deployment sce-  
12 narios, such as individual technology  
13 applications, combination technology  
14 applications, and integrated control  
15 system applications;

16 “(vi) include—

17 “(I) an analysis of the use of a  
18 comprehensive suite of distributed en-  
19 ergy resources; and

20 “(II) an assessment of the com-  
21 petitive markets for each distributed  
22 energy resource;

23 “(vii) consider various electric grid ar-  
24 chitecture concepts and tools, including the

1 development of local energy networks inter-  
2 connected with the electric grid;

3 “(viii) include an analysis of the ways  
4 in which the different scenarios incor-  
5 porated under clause (v) may impact the  
6 broader energy system, such as the bulk  
7 power system, the transmission network,  
8 and natural gas infrastructure;

9 “(ix) assess any barriers to the ability  
10 of distributed energy resources to provide  
11 the identified electric grid services;

12 “(x) to the maximum extent prac-  
13 ticable—

14 “(I) seek to use any relevant pre-  
15 existing research and ongoing work;  
16 and

17 “(II) avoid duplication of effort;  
18 and

19 “(xi) conduct estimates for the 5-, 10-  
20 , and 15-year periods beginning on the  
21 date of enactment of the Flexible Grid In-  
22 frastructure Act of 2017.

23 “(2) REPORTS.—Not later than 18 months  
24 after the date of enactment of the Flexible Grid In-  
25 frastructure Act of 2017, and not less frequently

1 than once every 3 years thereafter, the Commission  
2 and the Secretary shall submit to Congress a report  
3 describing the results of the most recent assessment  
4 under paragraph (1) that includes—

5 “(A) a description of the details required  
6 under clauses (i) through (xi) of paragraph  
7 (1)(B);

8 “(B) data reported and analyzed—

9 “(i) on a nationwide basis;

10 “(ii) on a State basis, for each of the  
11 several States of the United States;

12 “(iii) by sector;

13 “(iv) by balancing authority; and

14 “(v) to reflect—

15 “(I) granular locational charac-  
16 teristics, such as load pockets and  
17 grid congestion;

18 “(II) granular temporal charac-  
19 teristics, such as hourly and subhourly  
20 electricity generation costs and elec-  
21 tricity network costs; and

22 “(III) the specific electric grid  
23 services identified by the study under  
24 section 3(b) of the Flexible Grid In-  
25 frastructure Act of 2017;

1 “(C) macroeconomic data, including an  
2 analysis of any effects on job creation,  
3 economywide costs and benefits, energy produc-  
4 tivity, retail rate impacts, and gross domestic  
5 product;

6 “(D) a description of the methodology used  
7 to conduct the assessment described in para-  
8 graph (1); and

9 “(E) policy recommendations—

10 “(i) to achieve the estimated potential  
11 identified by the assessment under para-  
12 graph (1)(A);

13 “(ii) to promote the development of  
14 competitive markets for distributed energy  
15 resources assessed under paragraph  
16 (1)(B)(vi)(II); and

17 “(iii) to address the barriers described  
18 in paragraph (1)(B)(ix).

19 “(3) REDUCING DUPLICATION OF EFFORT.—In  
20 conducting the assessment under paragraph (1), the  
21 Commission and the Secretary shall use, to the max-  
22 imum extent practicable, data and studies in exist-  
23 ence as of the date of the assessment in an effort  
24 to reduce the potential for duplication of effort.

1       “(d) TECHNICAL ASSISTANCE.—The Secretary shall  
2 provide technical assistance to energy distribution utilities,  
3 State energy regulators, State energy offices, third-party  
4 energy service providers, wholesale market operators, and  
5 other interested parties relating to—

6               “(1) use of the data and modeling tools pro-  
7 vided under this section; and

8               “(2) the general planning and market analysis  
9 required for cost-effective deployment of distributed  
10 energy resources and grid flexibility assets.

11       “(e) VOLUNTARY NATIONAL ACTION PLAN ON DIS-  
12 TRIBUTED ENERGY RESOURCES.—

13               “(1) IN GENERAL.—Not later than 1 year after  
14 the date of submission of the initial report required  
15 under subsection (c)(2), the Secretary, in consulta-  
16 tion with the Commission, shall develop a voluntary  
17 national action plan to unlock the potential of dis-  
18 tributed energy resources to provide electric grid  
19 services, which shall be based on the assessments re-  
20 quired under subsection (c)(1).

21               “(2) REQUIREMENTS.—In developing the vol-  
22 untary national action plan under this subsection, to  
23 the maximum extent practicable, the Secretary  
24 shall—

1           “(A) use relevant information contained in  
2           the National Action Plan on Demand Response  
3           prepared by the Commission, Docket No.  
4           AD09–10, dated June 17, 2010; and

5           “(B) solicit participation, and take into  
6           consideration comments, from other Federal  
7           agencies, the National Laboratories, the Na-  
8           tional Academy of Sciences, State and local  
9           governments, industry, research institutions,  
10          nonprofit organizations, consumer advocates,  
11          and other interested parties.

12          “(3) INCLUSIONS.—The voluntary national ac-  
13          tion plan developed under this subsection shall in-  
14          clude provisions for—

15               “(A) the identification of requirements for  
16               technical assistance to States to allow States to  
17               maximize distributed energy resource potential  
18               that can be developed and deployed cost-effec-  
19               tively;

20               “(B) the design of a national communica-  
21               tions program that includes broad-based cus-  
22               tomer education and support; and

23               “(C) the identification or development of  
24               analytical tools, information, model regulatory  
25               provisions, model contracts, and other support



1 materials for use by customers, States, utilities,  
2 and demand response providers.”.

3 (b) STUDY ON VALUATION OF ELECTRIC GRID SERV-  
4 ICES.—

5 (1) IN GENERAL.—Not later than 1 year after  
6 the date of enactment of this Act, and not less fre-  
7 quently than once every 3 years thereafter, the Sec-  
8 retary and the Commission shall conduct a com-  
9 prehensive study that—

10 (A) incorporates the assessment required  
11 under subsection (c)(1) of section 921 of the  
12 Energy Policy Act of 2005 (42 U.S.C. 16211);

13 (B) identifies and analyzes—

14 (i) all electric grid services that can be  
15 provided, including—

16 (I) emerging electric grid service  
17 needs; and

18 (II) electric grid services that can  
19 be provided by—

20 (aa) conventional energy  
21 technologies, such as centralized  
22 thermal generation units and  
23 electricity transmission infra-  
24 structure;

1 (bb) utility-scale renewable  
 2 energy generation technologies;  
 3 and

4 (cc) emerging energy tech-  
 5 nologies, such as grid-scale en-  
 6 ergy storage and distributed en-  
 7 ergy resources;

8 (ii)(I) the specific electric grid serv-  
 9 ices, the value of which is conditioned by  
 10 locational value and temporal value; and

11 (II) the degree of effect of location  
 12 and time on the value of the electric grid  
 13 services identified under subclause (I);

14 (iii) for each electric grid service iden-  
 15 tified under clauses (i) and (ii), the specific  
 16 technologies (including the technologies  
 17 identified under clause (i)(II)) that have  
 18 the capacity to provide the electric grid  
 19 service, including an analysis of the extent  
 20 to which a given technology can provide a  
 21 given electric grid service; and

22 (iv) the effect of integrated energy  
 23 control systems (such as microgrids) on  
 24 the value of grid services;

1 (C) quantifies the estimated value of those  
2 electric grid services, taking into consideration  
3 input from relevant industry stakeholders and  
4 unique regulatory and regional electricity sys-  
5 tem characteristics; and

6 (D) identifies—

7 (i) any barriers to wholesale market  
8 participation for distributed energy re-  
9 sources; and

10 (ii) the most effective mechanisms for  
11 opening electricity markets to increased  
12 competition, consumer choice, and innova-  
13 tion.

14 (2) PUBLIC COMMENT.—In conducting the  
15 study under paragraph (1), the Secretary and the  
16 Commission shall solicit relevant public comments.

17 (3) CONSULTATION.—As soon as practicable  
18 after the date of enactment of this Act, in con-  
19 ducting the study under paragraph (1), the Sec-  
20 retary and the Commission shall engage a broad set  
21 of experts from other Federal agencies, the National  
22 Laboratories, the National Academy of Sciences,  
23 States, Tribal governments, units of local govern-  
24 ment, industry, research institutions, nonprofit orga-

1 nizations, consumer advocates, and other interested  
2 parties.

3 (4) REPORTS.—Not later than 18 months after  
4 the date of enactment of this Act, and not less fre-  
5 quently than once every 3 years thereafter, the Sec-  
6 retary and the Commission shall submit to Congress  
7 a report describing the results of the most recent  
8 study conducted under paragraph (1).

9 (c) MODELING.—

10 (1) IN GENERAL.—The Secretary, in consulta-  
11 tion with the Administrator, shall expand modeling  
12 capabilities for the electric power sector to more ac-  
13 curately reflect the role of distributed energy re-  
14 sources in current and future energy consumption  
15 and in the optimization of the electric grid.

16 (2) GRID OPTIMIZATION IN THE CONTEXT OF  
17 DER AND STORAGE.—Not later than 1 year after the  
18 date of submission of the initial report required  
19 under subsection (c)(2) of section 921 of the Energy  
20 Policy Act of 2005 (42 U.S.C. 16211), the Sec-  
21 retary, in consultation with the Administrator and  
22 the Commission, shall provide modeling tools to as-  
23 sist energy distribution utilities, State regulatory au-  
24 thorities, State energy offices, third-party energy  
25 service providers, and wholesale market operators in

1 the planning and market analysis required for cost-  
 2 effective optimization of the electric grid and deploy-  
 3 ment of distributed energy resources and grid-scale  
 4 energy storage, including modeling tools for assess-  
 5 ing individual technologies, combinations of tech-  
 6 nologies, or integrated control system applications.

7 (3) DATA AND METHODOLOGIES.—The mod-  
 8 eling tools provided under paragraph (2) shall incor-  
 9 porate the data and methodologies used to produce  
 10 the reports required under subsection (c)(2) of sec-  
 11 tion 921 of the Energy Policy Act of 2005 (42  
 12 U.S.C. 16211).

13 (4) NATIONAL ENERGY MODELING SYSTEMS  
 14 (NEMS) DEVELOPMENT.—The Administrator shall  
 15 continue to evaluate options for expanding the capa-  
 16 bility of the National Energy Modeling Systems  
 17 Electricity Market Module to accurately represent  
 18 the complexity of the electric power sector, including  
 19 by—

20 (A) incorporating hourly and subhourly  
 21 electric power sector data; and

22 (B) including the services provided by dis-  
 23 tributed energy resources and energy storage.

24 (d) STUDY OF BARRIERS TO ADVANCED TRANS-  
 25 MISSION TECHNOLOGIES.—

1           (1) IN GENERAL.—Not later than 1 year after  
2           the date of enactment of this Act, to enable deploy-  
3           ment of technologies that cost-effectively increase ex-  
4           isting transmission capacity use, the Secretary, in  
5           consultation with relevant stakeholders, shall con-  
6           duct a study to identify, analyze, and develop rec-  
7           ommendations for removing barriers to the valuation  
8           and deployment of advanced materials and tech-  
9           nologies for new and existing transmission, such as  
10          advanced technologies that enhance reliability, secu-  
11          rity, efficiency, capacity, and affordability through  
12          visibility, analytics, and controls.

13          (2) CONSULTATION.—As soon as practicable  
14          after the date of enactment of this Act, in con-  
15          ducting the study under paragraph (1), the Sec-  
16          retary shall engage stakeholders and experts from  
17          other Federal agencies, the National Laboratories,  
18          States, Tribal governments, units of local govern-  
19          ment, industry, research institutions, nonprofit orga-  
20          nizations, and other interested parties.

21          (3) REPORTS.—Not later than 18 months after  
22          the date of enactment of this Act, the Secretary  
23          shall submit to Congress a report describing—

24                  (A) the recommendations developed under  
25          the study conducted under paragraph (1);

1 (B) a framework for future research into  
2 removing the barriers identified and analyzed  
3 under the study, based on—

4 (i) the recommendations developed  
5 under the study; and

6 (ii) research on transmission capacity  
7 use, performance from synchrophasor in-  
8 formation, advanced conductors, advanced  
9 transmission tower designs, dynamic line  
10 rating, advanced power flow control, and  
11 energy storage; and

12 (C) the methodology used in the study, in-  
13 cluding the methodology used to produce the  
14 recommendations developed under the study.

15 (e) DER DATA CLEARINGHOUSE.—Not later than  
16 180 days after the date of submission of the initial report  
17 required under subsection (c)(2) of section 921 of the En-  
18 ergy Policy Act of 2005 (42 U.S.C. 16211), the Secretary  
19 and the Commission shall establish on the Internet a  
20 clearinghouse of nonpersonally identifiable data relating to  
21 distributed energy resources, including the data used to  
22 conduct the assessment and report under paragraphs (1)  
23 and (2), respectively, of subsection (c) of section 921 of  
24 the Energy Policy Act of 2005 (42 U.S.C. 16211), ex-  
25 pressed—

1 (1) on a nationwide basis;

2 (2) on a State basis, for each of the several  
3 States of the United States;

4 (3) by sector; and

5 (4) to reflect—

6 (A) granular locational characteristics,  
7 such as load pockets and electric grid conges-  
8 tion;

9 (B) granular temporal characteristics, such  
10 as hourly and subhourly electricity generation  
11 costs and electricity network costs; and

12 (C) the specific electric grid services identi-  
13 fied by the study under section 3(b).

14 (f) AUTHORIZATION OF APPROPRIATIONS.—There is  
15 authorized to be appropriated to carry out this section (in-  
16 cluding the amendments made by this section)  
17 \$50,000,000, to remain available for a period of 10 years  
18 following the fiscal year for which the amounts were ap-  
19 propriated.

20 **SEC. 4. ELECTRIFICATION OF VEHICLES AND HEATING.**

21 (a) RESEARCH, DEVELOPMENT, AND DEMONSTRA-  
22 TION ACTIVITIES.—

23 (1) IN GENERAL.—In accordance with para-  
24 graphs (2) and (3), the Secretary shall conduct a  
25 program of research, development, and demonstra-



tion activities to advance the electrification of transportation, heating (including water heating and space heating), and other technologies, including by identifying ways to increase the resilience, efficiency, and environmental performance of the electric grid.

(2) HEATING RESEARCH, DEVELOPMENT, AND DEMONSTRATION ACTIVITIES.—

(A) IN GENERAL.—Not later than 180 days after the date of enactment of this Act, the Secretary shall initiate research, development, and demonstration activities—

(i) to develop the ability of electric heating technologies (including water heating and space heating) to provide value to electricity systems, including by operating as an energy storage resource used on a regular basis as part of grid operation to improve the operational efficiency of the electric grid;

(ii) to advance the technical understanding of—

(I) the manner in which electric heating technologies are controlled and optimized, including by advancing

1                   telemetry and embedded metrology;  
2                   and

3                   (II) the practices of transmitting  
4                   secure data over the Internet, a utility  
5                   system, or other mechanism, with a  
6                   means for implementation, such as a  
7                   standard;

8                   (iii) to optimize electric heating tech-  
9                   nologies for—

10                   (I) the integration of renewable  
11                   energy technologies; and

12                   (II) the reduction of greenhouse  
13                   gases and other pollutants;

14                   (iv) to investigate the technical, eco-  
15                   nomic, and legal details of using electric  
16                   heating technologies for a range of electric  
17                   grid services, including—

18                   (I) energy storage;

19                   (II) demand response; and

20                   (III) frequency regulation and  
21                   other ancillary services;

22                   (v) to diminish the market barriers to  
23                   the broad adoption of heating technologies  
24                   with digital control and communication

1 technologies that enable grid interoper-  
2 ability and integration;

3 (vi) to address nonrecurring engineer-  
4 ing costs associated with the development  
5 of interoperable electric heating tech-  
6 nologies;

7 (vii) to investigate and implement ap-  
8 proaches to the aggregation, wholesale  
9 electricity marketing, and, to the maximum  
10 extent practicable, retail electricity mar-  
11 keting of electric grid services provided by  
12 electric heating, including research into the  
13 use of transactive energy systems as a  
14 means of enabling efficient operations;

15 (viii) to investigate and implement  
16 programs to improve the access to, and af-  
17 fordability of, electric heating technologies  
18 for low-income populations;

19 (ix) to implement innovative consumer  
20 marketing and contracting models, includ-  
21 ing pricing approaches (including con-  
22 sumer access to wholesale market pricing  
23 signals), that co-optimize customer benefits  
24 and electric grid benefits;

1 (x) to demonstrate best practices  
2 for—

3 (I) customer participation and  
4 satisfaction; and

5 (II) maximizing customer bene-  
6 fits;

7 (xi) to investigate and implement  
8 user-friendly equipment financing models  
9 linked to the marketing of electric grid  
10 services, including the means by which the  
11 electric grid services provided by electric  
12 heating technologies can help finance the  
13 cost of the electric heating technology; and

14 (xii) to develop a methodology for  
15 modeling load increases expected from the  
16 deployment of electric heating technologies.

17 (B) CONSULTATION.—As soon as prac-  
18 ticable after the date of enactment of this Act,  
19 in carrying out the activities under subpara-  
20 graph (A), the Secretary shall consult with  
21 stakeholders, including—

22 (i) other Federal agencies;

23 (ii) the National Laboratories;

24 (iii) States;

25 (iv) Tribal governments;

- 1 (v) units of local government;
- 2 (vi) electric utilities, such as investor-
- 3 owned electric utilities, publicly owned elec-
- 4 tric utilities, and electric cooperatives;
- 5 (vii) private companies, including en-
- 6 ergy technology manufacturers;
- 7 (viii) third-party energy service pro-
- 8 viders;
- 9 (ix) institutions of higher education;
- 10 and
- 11 (x) nonprofit organizations.

12 (3) ELECTRIC VEHICLE RESEARCH, DEVELOP-  
 13 MENT, AND DEMONSTRATION ACTIVITIES.—

14 (A) IN GENERAL.—Not later than 180  
 15 days after the date of enactment of this Act,  
 16 the Secretary, in collaboration with the Sec-  
 17 retary of Transportation, shall initiate research,  
 18 development, and demonstration activities—

- 19 (i) to advance the co-optimization of
- 20 electrified transportation and electricity
- 21 systems, including by identifying ways to
- 22 increase the resilience, efficiency, and envi-
- 23 ronmental performance of the electric grid
- 24 and the transportation system;

1 (ii) to advance the technical under-  
2 standing of—

3 (I) the manner in which vehicle  
4 charging systems are controlled and  
5 optimized, including by advancing ve-  
6 hicle and charging station telemetry  
7 and embedded metrology; and

8 (II) the practices of transmitting  
9 secure data over the Internet, a utility  
10 system, or other mechanism, with a  
11 means for implementation, such as a  
12 standard;

13 (iii) to optimize electric vehicles for  
14 the integration of renewable energy tech-  
15 nologies and the reduction of greenhouse  
16 gases and other pollutants;

17 (iv) to investigate the technical, eco-  
18 nomic, and legal details of using fleet,  
19 transit, and municipal vehicle batteries for  
20 a range of electric grid services, includ-  
21 ing—

22 (I) demand response;

23 (II) frequency regulation and  
24 other ancillary services; and

1 (III) energy output, or full-scale  
2 vehicle-to-electric grid, operations;

3 (v) to investigate the co-optimization  
4 of the electrification of transportation with  
5 advancements in autonomous vehicles and  
6 the use of vehicles for ride sharing, includ-  
7 ing by—

8 (I) studying consumer participa-  
9 tion and other behavioral challenges,  
10 including incentives that promote co-  
11 optimization; and

12 (II) researching challenges and  
13 opportunities relating to the optimiza-  
14 tion of electric grid operations in the  
15 context of autonomous vehicle and  
16 ride-sharing usage patterns, including  
17 the use of energy storage in charging  
18 systems;

19 (vi) to investigate, in collaboration  
20 with the Commission, approaches to the  
21 aggregation, wholesale electricity mar-  
22 keting, and, to the maximum extent prac-  
23 ticable, retail electricity marketing of elec-  
24 tric grid services provided by electric vehi-  
25 cles, including research into the use of

transactive energy systems as a means of  
enabling vehicle-electric grid integration;

(vii) to implement innovative consumer marketing and contracting models, including pricing approaches (including consumer access to wholesale market pricing signals), that co-optimize transportation benefits and electric grid benefits, including by maximizing the value of the vehicle services to the electric grid while also maximizing value to the consumer (including by maximizing the flexibility of use of the vehicle to the driver or rider);

(viii) to investigate and implement user-friendly electric vehicle and related equipment financing models linked to the marketing of electric grid services, including the means by which the electric grid services provided by an electric vehicle can help finance the cost of the vehicle;

(ix) to investigate and implement programs to improve the access to, and affordability of, electric vehicles for low-income populations;



1 (x)(I) to advance best practices for  
 2 manufacturers of electric vehicles, charging  
 3 equipment, and systems; and

4 (II) to embed those practices in pro-  
 5 grams and grant opportunities of the De-  
 6 partment of Energy to leverage competitive  
 7 market electric vehicle products and  
 8 incentivize more rapid and widespread  
 9 adoption;

10 (xi) to assist electric utilities and  
 11 transit agencies in collaboratively planning  
 12 an electrified fleet;

13 (xii) to investigate the use of fleet,  
 14 transit, and municipal vehicle batteries as  
 15 power sources for community shelter facili-  
 16 ties during emergencies;

17 (xiii) to develop analytical tools and fi-  
 18 nancial models to assist electric utilities  
 19 and transit agencies in assessing electric  
 20 utility and infrastructure requirements to  
 21 support selected transit vehicle tech-  
 22 nologies and charging profiles, including  
 23 analytic tools—

24 (I) to optimize the total cost of  
 25 ownership;

1 (II) to develop electrification  
 2 route maps and transition plans, with  
 3 quantitative estimates of the popu-  
 4 lation-weighted reductions in pollutant  
 5 exposure from electrification of spe-  
 6 cific routes, including criteria pollut-  
 7 ants and new pollutants of concern;  
 8 and

9 (III) to articulate the strategy  
 10 and timelines for transitioning to  
 11 zero-emission vehicles;

12 (xiv) to investigate scenarios for the  
 13 sharing of battery assets for the purpose of  
 14 maximizing cost-performance and battery  
 15 use, including—

16 (I) scenarios that optimize shared  
 17 usage between transit agencies and  
 18 electric utilities over the lifecycle of  
 19 the battery;

20 (II) incentives for an entity (such  
 21 as an electric utility) to provide fund-  
 22 ing to reduce initial premium costs  
 23 by—

1 (aa) owning the battery of a  
2 transit agency transit vehicle;  
3 and

4 (bb) charging the battery  
5 using smart charging; and

6 (III) enabling the entity to repo-  
7 sition the battery into stationary use  
8 after the battery has served the ex-  
9 pected life of the battery in mobility  
10 use;

11 (xv) to develop a methodology for  
12 modeling load increases expected from elec-  
13 trifying the transportation sector; and

14 (xvi) to investigate the deployment of  
15 electric vehicle technologies and charging  
16 infrastructure within scalable and inte-  
17 grated energy management systems as part  
18 of community energy infrastructure devel-  
19 opment.

20 (B) CONSULTATION.—As soon as prac-  
21 ticable after the date of enactment of this Act,  
22 in carrying out the activities under subpara-  
23 graph (A), the Secretary shall consult with  
24 stakeholders, including—

25 (i) vehicle manufacturers, including—

- 1 (I) manufacturers of light-, me-  
2 dium-, and heavy-duty vehicles; and  
3 (II) transit vehicle manufactur-  
4 ers;  
5 (ii) electric utilities, such as investor-  
6 owned electric utilities, publicly owned elec-  
7 tric utilities, and electric cooperatives;  
8 (iii) third-party energy service pro-  
9 viders;  
10 (iv) transit agencies;  
11 (v) fleet operators;  
12 (vi) private companies, including en-  
13 ergy technology manufacturers and battery  
14 manufacturers;  
15 (vii) other Federal agencies;  
16 (viii) the National Laboratories;  
17 (ix) States;  
18 (x) Tribal governments;  
19 (xi) units of local government;  
20 (xii) nonprofit organizations;  
21 (xiii) institutions of higher education;  
22 (xiv) electric vehicle supply equipment  
23 and charging infrastructure manufactur-  
24 ers; and  
25 (xv) battery manufacturers.

1 (b) AUTHORIZATION OF APPROPRIATIONS.—There is  
 2 authorized to be appropriated to carry out this section  
 3 \$100,000,000, to remain available for a period of 10 years  
 4 following the fiscal year for which the amounts were ap-  
 5 propriated.

6 **SEC. 5. PRIVACY, SECURITY, AND RESILIENCE.**

7 (a) PROTECTING PRIVACY AND SECURITY.—In car-  
 8 rying out this Act, the Secretary, the Administrator, and  
 9 the Secretary of Homeland Security shall identify, incor-  
 10 porate, and follow best practices for protecting the privacy  
 11 of individuals and businesses and the respective sensitive  
 12 data of the individuals and businesses, including by man-  
 13 aging privacy risk and implementing the Fair Information  
 14 Practice Principles of the Federal Trade Commission for  
 15 the collection, use, disclosure, and retention of individual  
 16 electric consumer information in accordance with the Of-  
 17 fice of Management and Budget Circular A–130 (or suc-  
 18 cessor circulars).

19 (b) PERSONAL PROTECTIONS FOR SENSITIVE PER-  
 20 SONAL DATA.—No Federal entity shall request the cre-  
 21 ation, recording, or collection of data identified to an indi-  
 22 vidual person as a result of this Act.

23 (c) LAW ENFORCEMENT REQUIREMENTS.—

24 (1) DEFINITIONS.—In this subsection:

1 (A) GOVERNMENTAL ENTITY.—The term  
 2 “governmental entity” has the meaning given  
 3 that term in section 2711 of title 18, United  
 4 States Code.

5 (B) JUDGE OF COMPETENT JURISDICTION;  
 6 STATE.—The terms “judge of competent juris-  
 7 diction” and “State” have the meanings given  
 8 such terms in section 2510 of title 18, United  
 9 States Code.

10 (2) CONSUMER INFORMATION.—A govern-  
 11 mental entity may obtain from an electric utility,  
 12 third-party aggregator, or other nongovernmental  
 13 entity under an administrative subpoena authorized  
 14 by a Federal or State statute or a Federal or State  
 15 grand jury or trial subpoena the—

- 16 (A) name of an electric consumer;
- 17 (B) address of an electric consumer;
- 18 (C) length of service (including start date)
- 19 of, and types of service used by, an electric con-
- 20 sumer; and
- 21 (D) means and source of payment for such
- 22 service (including any credit card or bank ac-
- 23 count number) of an electric consumer.

24 (3) ELECTRIC USAGE INFORMATION.—A gov-  
 25 ernmental entity may only require the disclosure by

1 an electric utility, third-party aggregator, or other  
2 nongovernmental entity of information regarding the  
3 use of electricity by an electric consumer (including  
4 monthly usage data, data at a greater level of detail  
5 or specificity, and information about electric use by  
6 specific appliances) pursuant to a warrant issued  
7 based on probable cause, using the procedures de-  
8 scribed in the Federal Rules of Criminal Procedure  
9 (or, in the case of a State court, issued using State  
10 warrant procedures) by a court of competent juris-  
11 diction.

12 (4) NOTICE.—

13 (A) IN GENERAL.—Not later than 30 days  
14 after obtaining a warrant for electric usage in-  
15 formation described in paragraph (3), a govern-  
16 mental entity shall notify each electric con-  
17 sumer whose information was obtained.

18 (B) DELAY OF NOTICE.—

19 (i) IN GENERAL.—Upon application  
20 by a governmental entity, a judge of com-  
21 petent jurisdiction may issue an order au-  
22 thorizing the governmental entity to delay  
23 notice under subparagraph (A) for a period  
24 of not more than 180 days if the judge

finds reason to believe notifying the electric consumer of the order will result in—

(I) endangering the life or physical safety of an individual;

(II) flight from prosecution;

(III) destroying of or tampering with evidence;

(IV) intimidation of potential witnesses; or

(V) otherwise seriously jeopardizing an investigation or unduly delaying a trial.

(ii) UNLIMITED RENEWALS.—Upon application by a governmental entity, a judge of competent jurisdiction may renew an order delaying notice under clause (i) for additional periods of not longer than 180 days if the judge makes a finding described in clause (i).

(5) SUPPRESSION.—Any electric usage information described in paragraph (3), or evidence directly or indirectly derived from such information, may not be received in evidence in any trial, hearing, or other proceeding in or before any court, grand jury, department, officer, agency, regulatory body, legislative



1 committee, or other authority of the United States,  
2 a State, or a political subdivision thereof if the ob-  
3 taining of the information was not conducted in ac-  
4 cordance with this subsection.

5 (6) REPORTING.—

6 (A) BY GOVERNMENTAL ENTITIES.—In  
7 January of each year, each governmental entity  
8 shall submit to the Administrative Office of the  
9 United States Courts information regarding any  
10 warrant described in paragraph (3) that was  
11 sought or obtained by the governmental entity  
12 during the previous year, including—

13 (i) the number of warrants described  
14 in paragraph (3) sought by the govern-  
15 mental entity;

16 (ii) the number of warrants described  
17 in paragraph (3) obtained by the govern-  
18 mental entity; and

19 (iii) for each warrant described in  
20 paragraph (3) sought or obtained by the  
21 governmental entity—

22 (I) the offense specified in the  
23 application; and

24 (II) the identity of the officer ap-  
25 plying for the warrant.

(B) REPORT TO CONGRESS.—As part of the report submitted under section 2519(3) of title 18, United States Code, the Administrative Office of the United States Courts shall provide to Congress, with respect to the previous year—

(i) the number of warrants described in paragraph (3) sought by governmental entities;

(ii) the number of warrants described in paragraph (3) obtained by governmental entities; and

(iii) a summary and analysis of the data required to be filed with the Administrative Office under subparagraph (A).

(d) MANAGING EMERGING THREATS TO THE ELECTRIC GRID.—

(1) MODEL STANDARDS FOR THE DISTRIBUTION GRID.—

(A) IN GENERAL.—Not later than 1 year after the date of enactment of this Act, the Secretary shall develop model standards to assist States, electric cooperatives, and publicly owned electric utilities in the voluntary updating of standards for resource planning, energy assurance planning, ensuring distribution-grid reli-

1 ability from natural disasters, and improving  
2 security with respect to cyber and physical  
3 threats, taking into consideration—

4 (i) the increased use of smart grid  
5 technologies, variable energy generation,  
6 energy storage, and distributed energy re-  
7 sources;

8 (ii) standards for critical infrastruc-  
9 ture; and

10 (iii) emerging and rapidly evolving  
11 hazards.

12 (B) CONSULTATION.—As soon as prac-  
13 ticable after the date of enactment of this Act,  
14 in developing the model standards under sub-  
15 paragraph (A), the Secretary shall consult  
16 with—

17 (i) States;

18 (ii) utilities, such as investor-owned  
19 electric utilities, publicly owned utilities,  
20 and electric cooperatives;

21 (iii) third-party energy service pro-  
22 viders;

23 (iv) other Federal agencies;

24 (v) the Electric Reliability Organiza-  
25 tion;

- 1 (vi) private companies, including en-
- 2 ergy technology manufacturers;
- 3 (vii) the National Laboratories;
- 4 (viii) nonprofit organizations; and
- 5 (ix) institutions of higher education.

6 (2) EQUIPMENT STANDARDS AND TESTING PRO-  
7 CEDURES.—Not later than 3 years after the date of  
8 enactment of this Act, the Secretary, in collaboration  
9 with the Secretary of Commerce (acting through the  
10 Director of the National Institute of Standards and  
11 Technology), electric utilities, States, and standard-  
12 making organizations, shall—

13 (A) evaluate whether new performance  
14 standards and testing procedures are needed to  
15 ensure electrical equipment resilience in the  
16 face of emerging and rapidly evolving hazards  
17 (like cyber and physical threats and natural dis-  
18 asters) taking into consideration the increased  
19 use of smart grid technologies, variable energy  
20 generation, energy storage, distributed energy  
21 resources, and capabilities for autonomous en-  
22 ergy systems integration and management  
23 (such as islandable microgrids); and

1 (B) develop and submit to Congress a set  
2 of recommendations for distribution equipment  
3 manufacturers to voluntarily—

4 (i) minimize disruptions of inter-  
5 connected distributed energy resources and  
6 associated data feeds, especially during  
7 critical peak demand; and

8 (ii) support the reliability and resil-  
9 ience of the distribution grid.

10 (e) DEVELOPMENT OF UNIFORM COST-BENEFIT  
11 ANALYSIS METHODS FOR SECURITY AND RESILIENCE.—

12 (1) IN GENERAL.—Not later than 1 year after  
13 the date of enactment of this Act, the Secretary  
14 shall develop and submit to Congress a set of meth-  
15 ods and guidelines for calculating the costs and ben-  
16 efits of investments in resilience and security solu-  
17 tions for the electric grid, including—

18 (A) the development of uniform and tech-  
19 nology-neutral methods for valuing electric grid  
20 reliability and security, taking into consider-  
21 ation the results of the study conducted under  
22 section 3(b);

23 (B) guidelines for valuing the management  
24 of risks associated with high-impact events,  
25 such as threats related to cyber or physical at-

1           tacks, natural disasters, or combined threats,  
 2           including the value of State and local energy as-  
 3           surance planning and investment; and

4           (C) methods on how to quantify the secu-  
 5           rity and resilience benefits that are unique to  
 6           distributed energy resources and grid-scale en-  
 7           ergy storage.

8           (2) CONSULTATION.—As soon as practicable  
 9           after the date of enactment of this Act, in devel-  
 10          oping the methods and guidelines under paragraph  
 11          (1), the Secretary shall consult with industry and  
 12          government stakeholders, including the stakeholders  
 13          described in subsection (d)(1)(B).

14   **SEC. 6. WORKFORCE DEVELOPMENT.**

15          (a) IN GENERAL.—Not later than 1 year after the  
 16          date of enactment of this Act, the Secretary, in collabora-  
 17          tion with the Secretary of Labor and the Secretary of  
 18          Commerce, shall enhance and align current electricity sec-  
 19          tor workforce development and training programs to sat-  
 20          isfy training requirements relating to the increasing com-  
 21          plexity of the electric grid, including developing the abili-  
 22          ties—

23               (1) to manage the smart grid and the increased  
 24          digitization and connectivity of consumer devices and

1 the energy system, including managing cybersecurity  
2 risks; and

3 (2) to optimize the electric grid in the context  
4 of the increasing penetration of distributed energy  
5 resources, energy storage, variable renewable energy  
6 generation, electric vehicles, and new information,  
7 communication, and control capabilities involved in  
8 energy systems management.

9 (b) INITIATIVES.—In carrying out subsection (a), the  
10 Secretary shall—

11 (1) in collaboration with electric utilities, tech-  
12 nology providers to the utility industry, academic in-  
13 stitutions, nonprofit organizations, and Federal  
14 agencies (such as the Department of Labor, the Na-  
15 tional Science Foundation, the Department of Com-  
16 merce, the Department of Education, and the De-  
17 partment of Defense), coordinate Federal initiatives  
18 on electricity sector education and training, includ-  
19 ing by—

20 (A) establishing programs to facilitate na-  
21 tional training credentials in new electricity  
22 technologies;

23 (B) developing appropriate curricula for  
24 community colleges; and

1 (C) fostering lifelong learning relating to  
2 new electricity technologies;

3 (2) expand existing Department of Energy  
4 training programs to increase the number of intern-  
5 ships, fellowships, traineeships, and registered ap-  
6 prenticeships;

7 (3) in collaboration with the Secretary of  
8 Labor, develop workforce training curricula;

9 (4) in collaboration with the Secretary of  
10 Labor, improve labor market information on the  
11 changing requirements for skilled technical workers  
12 to better align workforce development with advances  
13 in science and technology;

14 (5) in collaboration with the Secretary of  
15 Labor, the Secretary of Defense, and the Secretary  
16 of Veterans Affairs, create workforce opportunities  
17 for veterans;

18 (6) in collaboration with the Secretary of  
19 Labor, create workforce opportunities that—

20 (A) expand workforce diversity; and

21 (B) provide to low- and moderate-income  
22 individuals job training that is aligned with in-  
23 demand jobs; and

24 (C) make use of partnerships between  
25 management and labor;



1           (7) in collaboration with the Secretary of  
2       Labor, the Secretary of Defense, and other relevant  
3       agencies, develop a single resource web portal to in-  
4       form industry and potential employees about the  
5       Federal agency workforce development initiatives  
6       and resources;

7           (8) develop workforce assessment tools to com-  
8       plement training programs; and

9           (9) support and facilitate regional approaches  
10      to workforce development, including workforce ef-  
11      forts of States and units of local government (such  
12      as workforce investment boards).

13      (c) DEPARTMENT OF LABOR LEADERSHIP.—In col-  
14      laborating with the Secretary to carry out subsection (a),  
15      the Secretary of Labor shall collaborate with the Secretary  
16      to expand Department of Labor preapprenticeship pro-  
17      grams in the electricity industry, with priority given to de-  
18      veloping preapprenticeship programs that align with the  
19      training initiatives described in subsection (b).

20      (d) COMMUNITY-CENTERED PROGRAMS.—

21           (1) IN GENERAL.—The Secretary, in collabora-  
22      tion with the Secretary of Labor, the Secretary of  
23      Veterans Affairs, and the Secretary of Health and  
24      Human Services, shall develop workforce training

1 programs to reach certain affected populations, in-  
 2 cluding—

3 (A) individuals displaced from declining  
 4 employment in the coal mining industry;

5 (B) low-income at-risk youth in urban en-  
 6 vironments;

7 (C) low-income and unemployed popu-  
 8 lations in rural areas;

9 (D) women;

10 (E) minorities; and

11 (F) workers displaced by technological ad-  
 12 vancements.

13 (2) DEMOGRAPHIC AWARENESS.—In developing  
 14 the programs under paragraph (1), the Secretary, in  
 15 collaboration with the Secretary of Labor, the Sec-  
 16 retary of Veterans Affairs, and the Secretary of  
 17 Health and Human Services, shall take into consid-  
 18 eration unique cultural, demographic, historical, and  
 19 economic factors—

20 (A) to ensure that the programs are appro-  
 21 priate for the populations described in subpara-  
 22 graphs (A) through (F) of paragraph (1); and

23 (B) to maximize the success of the pro-  
 24 grams.

25 (3) METRICS.—

1           (A) IN GENERAL.—In developing the pro-  
2           grams under paragraph (1), the Secretary, in  
3           collaboration with the Secretary of Labor, the  
4           Secretary of Veterans Affairs, and the Sec-  
5           retary of Health and Human Services, shall de-  
6           velop metrics for measuring the success of the  
7           programs developed under that paragraph, tak-  
8           ing into consideration public health and mental  
9           health factors, employment and earnings data,  
10          and community economic development factors.

11          (B) COLLECTION OF CERTAIN DATA.—For  
12          the purposes of collecting employment and  
13          earnings data for consideration under subpara-  
14          graph (A), the data shall be collected through  
15          means other than survey data or self-reported  
16          data, such as through agreements with Federal  
17          or State agencies.

18          (e) ANALYSIS.—Not later than 1 year after the date  
19          of enactment of this Act and every 3 years thereafter, the  
20          Secretary, in collaboration with the Secretary of Labor,  
21          shall conduct an analysis of employment within the energy  
22          sector, including a detailed analysis of the skill level and  
23          ability of the electricity sector workforce to manage the  
24          complexity and changes of the electricity system.

1       (f) CONSULTATION.—In carrying out this section, the  
2 Secretary, in collaboration with the Secretary of Labor,  
3 the Secretary of Commerce, the Secretary of Defense, and  
4 the Secretary of Veterans Affairs, shall consult with indus-  
5 try and government stakeholder, including—

6           (1) States;

7           (2) units of local government;

8           (3) electric utilities;

9           (4) third-party energy service providers;

10          (5) private companies, including energy tech-  
11 nology manufacturers;

12          (6) institutions of higher education; and

13          (7) nonprofit organizations.

14       (g) REPORTS.—Not later than 2 years after the date  
15 of enactment of this Act and every 3 years thereafter, the  
16 Secretary shall submit to Congress a report describing—

17           (1) the quantitative impact of programs carried  
18 out under this section;

19           (2) the results of the analysis conducted under  
20 subsection (e);

21           (3) a summary of benefits gained and barriers  
22 faced by individuals participating in programs under  
23 this section, including a description of—

24               (A) job opportunities created by the pro-  
25 grams; and

1 (B) skills gained by individuals partici-  
2 pating in the programs;

3 (4) national and regional observations and rec-  
4 ommendations to improve workforce development,  
5 including feedback from participants; and

6 (5) the administrative costs of the programs af-  
7 fected by this section.

8 **SEC. 7. FLEXIBLE GRID CHALLENGE 2022.**

9 (a) ESTABLISHMENT.—Not later than 180 days after  
10 the date of enactment of this Act, the Secretary shall es-  
11 tablish a competitive program, pursuant to section 24 of  
12 the Stevenson-Wydler Technology Innovation Act of 1980  
13 (15 U.S.C. 3719), to be known as the “Flexible Grid Chal-  
14 lenge 2022” (referred to in this section as the “pro-  
15 gram”), to award grants to States to enhance the peak  
16 load management and flexibility of the electric grid.

17 (b) CONSULTATION.—Pursuant to section 24(d) of  
18 the Stevenson-Wydler Technology Innovation Act of 1980  
19 (15 U.S.C. 3719(d)), the program shall seek to engage  
20 a broad set of experts, including from—

- 21 (1) electric utilities;  
22 (2) institutions of higher education;  
23 (3) other Federal agencies;  
24 (4) private companies, including energy tech-  
25 nology manufacturers;

- 1 (5) States;
- 2 (6) units of local government;
- 3 (7) nonprofit organizations; and
- 4 (8) the National Laboratories.

5 (c) GOALS.—The goals of the program shall be—

6 (1) to optimize—

7 (A) future electric infrastructure, including  
8 generation, delivery, consumption, and control  
9 methods;

10 (B) electric grid design solutions to ensure  
11 electric grid reliability and resilience; and

12 (C) retail electricity pricing and wholesale  
13 market valuation of electric grid services, taking  
14 into consideration consumer protection con-  
15 straints;

16 (2) to reliably, cost-effectively, safely, and se-  
17 curely integrate and manage variable and distributed  
18 energy resources, including—

19 (A) distributed generation;

20 (B) combined heat and power;

21 (C) energy storage;

22 (D) electric vehicles;

23 (E) energy efficiency;

24 (F) demand response;

1 (G) smart technologies that can enable in-  
2 tegrated systems control of distributed energy  
3 resources; and

4 (H) other technologies;

5 (3) to improve the integration and interoper-  
6 ability of telecommunications, information tech-  
7 nology, operational technologies, or other systems  
8 and technologies with the electric grid;

9 (4) to help States overcome any technological,  
10 regulatory, business model, and market barriers;

11 (5) to increase electricity reliability levels from  
12 levels available as of the date of enactment of this  
13 Act to levels sufficient to provide critical load;

14 (6) to define the role of the electric utility of  
15 the future as compared to products provided by mar-  
16 ket-driven entities;

17 (7) to mitigate specific challenges that are  
18 unique to the region where the project is located, in-  
19 cluding reliability and resilience concerns;

20 (8) to address the problems faced by the re-  
21 search community at the time of the award; and

22 (9) to achieve the goals described in paragraphs  
23 (1) through (8) by 2022.

24 (d) CRITERIA.—

1           (1) AWARD CRITERIA DEVELOPMENT.—Subject  
 2           to paragraphs (2) and (3), not later than 180 days  
 3           after the date of enactment of this Act, the Sec-  
 4           retary shall develop simple, ambitious, quantifiable,  
 5           and achievable performance criteria that shall be the  
 6           basis on which one or more winners will be selected  
 7           and publish a notice pursuant to section 24(f) of the  
 8           Stevenson-Wydler Technology Innovation Act of  
 9           1980 (15 U.S.C. 3719(f)).

10          (2) CONSIDERATIONS.—In developing the cri-  
 11          teria under paragraph (1), the Secretary shall con-  
 12          sider criteria that achieve the goals described in sub-  
 13          section (c).

14          (3) CONSULTATION.—Before establishing the  
 15          criteria under paragraph (1), the Secretary shall  
 16          consult with a broad set of experts, including experts  
 17          from entities described in subsection (b).

18          (e) AWARDS TO STATES.—

19            (1) IN GENERAL.—Not later than 5 years after  
 20           the selection of States participating in the program  
 21           under subsection (f)(3), the Secretary shall—

22                (A) select not more than 3 States as win-  
 23                ners of the program; and

24                (B) provide to each winner an award of  
 25                not more than \$50,000,000.



1           (2) BASIS OF SELECTION.—In selecting the  
 2 winners of the program under paragraph (1)(A), the  
 3 Secretary shall use the criteria developed and pub-  
 4 lished under subsection (d)(1).

5           (3) NO REQUIREMENT TO RECEIVE TECHNICAL  
 6 OR SUPPORT GRANTS.—The receipt or lack of re-  
 7 ceipt of technical assistance under subsection (g)(1)  
 8 or a support grant under subsection (g)(2) shall not  
 9 affect the eligibility of a State to be selected as a  
 10 winner of the program under paragraph (1).

11       (f) PROGRAM ELIGIBILITY.—

12           (1) APPLICATIONS.—Not later than 1 year  
 13 after the date of enactment of this Act, the Sec-  
 14 retary shall invite States to submit applications to  
 15 participate in the program.

16           (2) APPLICATION PROCESS.—A State seeking to  
 17 participate in the program shall submit to the Sec-  
 18 retary an application at such time, in such manner,  
 19 and containing such information as the Secretary  
 20 may require, including evidence that the State—

21                   (A) has partnered with, at a minimum—

22                           (i) an electric utility;

23                           (ii) an energy technology manufac-  
 24 turer; and

1 (iii) a National Laboratory or institu-  
 2 tion of higher education; and

3 (B) has established a plan for appropriate  
 4 use of any funds made available under the pro-  
 5 gram.

6 (3) DETERMINATION BY SECRETARY.—

7 (A) IN GENERAL.—Not later than 90 days  
 8 after the date on which an application is sub-  
 9 mitted under paragraph (2), the Secretary shall  
 10 determine whether the applicant State may par-  
 11 ticipate in the program.

12 (B) BASIS OF DETERMINATION.—In select-  
 13 ing States under subparagraph (A), the Sec-  
 14 retary shall ensure that the application of a se-  
 15 lected State demonstrates an ability to achieve  
 16 one or more of the goals described in subsection  
 17 (c).

18 (g) TECHNICAL ASSISTANCE AND GRANTS.—

19 (1) TECHNICAL ASSISTANCE.—The Secretary  
 20 shall provide to participant States selected under  
 21 subsection (f)(3) technical assistance in the form of  
 22 individual consultations, tools, and other resources,  
 23 on an as-needed basis.

24 (2) SUPPORT GRANTS.—

1 (A) IN GENERAL.—The Secretary shall  
2 provide support grants to participant States se-  
3 lected under subparagraph (E).

4 (B) APPLICATION PROCESS.—A participant  
5 State seeking a support grant shall submit to  
6 the Secretary an application at such time, in  
7 such manner, and containing such information  
8 as the Secretary may require, including a plan  
9 describing the proposed use of funds.

10 (C) ELIGIBILITY.—In determining the eli-  
11 gibility of a participant State for a support  
12 grant under subparagraph (A), the Secretary  
13 shall consider whether the plan of the partici-  
14 pant State described in subparagraph (B) in-  
15 cludes methods for achieving one or more of the  
16 goals described in subsection (c).

17 (D) AMOUNT OF SUPPORT GRANT.—The  
18 amount of a support grant awarded to a partic-  
19 ipant State selected under subparagraph (E)  
20 shall be not less than \$500,000 and not greater  
21 than \$10,000,000.

22 (E) DETERMINATION BY SECRETARY.—

23 (i) IN GENERAL.—Not later than 90  
24 days after the date on which an application

1 is submitted under subparagraph (B), the  
2 Secretary shall determine—

3 (I) whether the applicant State  
4 shall receive a support grant; and

5 (II) if so, the amount of the sup-  
6 port grant.

7 (ii) BASIS OF DETERMINATION.—In  
8 making a determination under clause (i),  
9 the Secretary shall ensure that the applica-  
10 tion of a selected State demonstrates an  
11 ability to achieve improvement in flexible  
12 peak load management one or more of the  
13 goals described in subsection (c).

14 (F) REQUIREMENT.—As a condition of re-  
15 ceiving financial assistance under this sub-  
16 section, a State receiving a support grant shall  
17 provide to the Secretary such information, at  
18 such time, and in such manner as the Secretary  
19 may require, to be made publicly available by  
20 the Secretary subject to applicable Federal pri-  
21 vacy laws.

22 (G) REPORTING BY PARTICIPANTS.—Not  
23 later than 1 year after the date on which a  
24 State initially receives a support grant, and  
25 each year thereafter for the duration of the

1 grant period, a State that receives a support  
2 grant shall submit to the Secretary a written  
3 report that—

4 (i) summarizes the benefits gained  
5 throughout the duration of the program;

6 (ii) describes barriers overcome during  
7 the program;

8 (iii) outlines a continuation plan in  
9 the event the State is not selected as a  
10 winner of the program under subsection  
11 (e); and

12 (iv) provides feedback on the program,  
13 including proposed modifications to the  
14 program.

15 (h) REPORTS.—Not later than 3 years after the date  
16 on which amounts are first distributed under this section,  
17 and not later than the date that is 3 years thereafter, the  
18 Secretary shall submit to Congress reports describing—

19 (1) the number, type, and details of projects  
20 proposed and projects undertaken under the pro-  
21 gram;

22 (2) a summary of benefits gained and barriers  
23 faced by participant States in the competition;

24 (3) a summary of continuation plans collected  
25 from the participant States;

1           (4) national and regional observations and rec-  
2           ommendations to improve peak load management  
3           and flexibility, including feedback from participant  
4           States;

5           (5) the administrative costs of the program;  
6           and

7           (6) the total amount of funds distributed under  
8           the program, including the amount awarded to each  
9           participant State.

10       (i) AUTHORIZATION OF APPROPRIATIONS.—

11           (1) IN GENERAL.—Subject to paragraph (2),  
12           there is authorized to be appropriated to carry out  
13           this section \$150,000,000, of which \$15,000,000 is  
14           authorized for use by the Department of Energy to  
15           administer the prize.

16           (2) AVAILABILITY.—The amounts authorized  
17           under paragraph (1) shall remain available until ex-  
18           pended.

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