

106TH CONGRESS  
1ST SESSION

# H. R. 2827

To amend the National Agricultural Research, Extension, and Teaching Policy Act of 1977 to authorize research to promote the conversion of biomass into biobased industrial products, and for other purposes.

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## IN THE HOUSE OF REPRESENTATIVES

SEPTEMBER 9, 1999

Mr. EWING (for himself and Mr. SHIMKUS) introduced the following bill; which was referred to the Committee on Agriculture, and in addition to the Committee on Science, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

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## A BILL

To amend the National Agricultural Research, Extension, and Teaching Policy Act of 1977 to authorize research to promote the conversion of biomass into biobased industrial products, 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 “National Sustainable  
5       Fuels and Chemicals Act of 1999”.

6       **SEC. 2. FINDINGS.**

7       Congress finds that—

1           (1) conversion of biomass into biobased indus-  
2       trial products offers outstanding potential for benefit  
3       to the national interest through improved strategic  
4       security and balance of payments, healthier rural  
5       economies, improved environmental quality, near-  
6       zero net greenhouse gas emissions, technology ex-  
7       port, and sustainable resource supply;

8           (2)(A) biomass is widely available at prices that  
9       are competitive with low cost petroleum; and

10          (B) the key technical challenges to be overcome  
11       in order for biobased industrial products to be cost  
12       competitive are finding new technology and reducing  
13       the cost of technology for converting biomass into  
14       desired biobased industrial products;

15          (3) biobased fuels, such as ethanol, have the  
16       clear potential to be sustainable, low cost, and high  
17       performance fuels that are compatible with both cur-  
18       rent and future transportation systems and provide  
19       near zero net greenhouse gas emissions;

20          (4) biobased chemicals—

21               (A) can provide functional replacements  
22       for essentially all organic chemicals that are  
23       currently derived from petroleum; and

24               (B) have the clear potential for environ-  
25       mentally benign product life cycles;

1           (5) biobased power can provide environmental  
2           benefits, promote rural economic development, and  
3           diversify energy resource options;

4           (6) many biomass feedstocks suitable for indus-  
5           trial processing show the clear potential for sustain-  
6           able production, in some cases resulting in improved  
7           soil fertility and carbon sequestration;

8           (7)(A) grain processing mills are biorefineries  
9           that produce a diversity of useful food, chemical,  
10          feed, and fuel products; and

11          (B) technologies that result in further diver-  
12          sification of the range of value-added biobased in-  
13          dustrial products can meet a key need for the grain  
14          processing industry;

15          (8)(A) cellulosic feedstocks are attractive be-  
16          cause of their low cost and widespread availability;  
17          and

18          (B) research resulting in cost-effective tech-  
19          nology to overcome the recalcitrance of cellulosic bio-  
20          mass would allow biorefineries to produce fuels and  
21          bulk chemicals on a very large scale, with a commen-  
22          surately large realization of the benefit described in  
23          paragraph (1);

24          (9) research into the fundamentals to under-  
25          stand important mechanisms of biomass conversion

1 can be expected to accelerate the application and ad-  
2 vancement of biomass processing technology by—

3 (A) increasing the confidence and speed  
4 with which new technologies can be scaled up;  
5 and

6 (B) giving rise to processing innovations  
7 based on new knowledge;

8 (10) the added utility of biobased industrial  
9 products developed through improvements in proc-  
10 essing technology would encourage the design of  
11 feedstocks that would meet future needs more effec-  
12 tively;

13 (11) the creation of value-added biobased indus-  
14 trial products would create new jobs in construction,  
15 manufacturing, and distribution, as well as new  
16 higher-valued exports of products and technology;

17 (12)(A) because of the relatively short-term  
18 time horizon characteristic of private sector invest-  
19 ments, and because many benefits of biomass proc-  
20 essing are in the national interest, it is appropriate  
21 for the Federal Government to provide  
22 precommercial investment in fundamental research  
23 and research-driven innovation in the biomass proc-  
24 essing area; and

1 (B) such an investment would provide a valu-  
2 able complement to ongoing and past governmental  
3 support in the biomass processing area; and

4 (13) several prominent studies, including stud-  
5 ies by the President’s Council of Advisors on Science  
6 and Technology and the National Research  
7 Council—

8 (A) support the potential for large re-  
9 search-driven advances in technologies for pro-  
10 duction of biobased industrial products as well  
11 as associated benefits; and

12 (B) document the need for a focused, inte-  
13 grated, and innovation-driven research effort to  
14 provide the appropriate progress in a timely  
15 manner.

16 **SEC. 3. CONVERSION OF BIOMASS INTO BIOBASED INDUS-**  
17 **TRIAL PRODUCTS.**

18 Title XIV of the National Agricultural Research, Ex-  
19 tension, and Teaching Policy Act of 1977 (7 U.S.C. 3101  
20 et seq.) is amended by adding at the end the following:

21 **“Subtitle N—Conversion of Bio-**  
22 **mass Into Biobased Industrial**  
23 **Products**

24 **“SEC. 1490. DEFINITIONS.**

25 “In this subtitle:

1           “(1) ADVISORY COMMITTEE.—The term ‘Advi-  
2       sory Committee’ means the Sustainable Fuels and  
3       Chemicals Technical Advisory Committee established  
4       by section 1490C.

5           “(2) BIOBASED INDUSTRIAL PRODUCT.—The  
6       term ‘biobased industrial product’ means any power,  
7       fuel, feed, chemical product, or other consumer good  
8       derived from biomass.

9           “(3) BIOMASS.—The term ‘biomass’ means any  
10      organic matter that is available on a renewable or  
11      recurring basis (excluding old growth timber), in-  
12      cluding dedicated energy crops and trees, wood and  
13      wood residues, plants (including aquatic plants),  
14      grasses, agricultural crops, residues, fibers, and ani-  
15      mal wastes and other waste materials.

16          “(4) BOARD.—The term ‘Board’ means the  
17      Sustainable Fuels and Chemicals Board established  
18      by section 1490B.

19          “(5) INITIATIVE.—The term ‘Initiative’ means  
20      the Sustainable Fuels and Chemicals Research Ini-  
21      tiative established under section 1490D.

22          “(6) POINT OF CONTACT.—The term ‘point of  
23      contact’ means a point of contact designated under  
24      section 1490A(d).

1           “(7) PROCESSING.—The term ‘processing’  
2       means the derivation of biobased industrial products  
3       from biomass, including—

4           “(A) feedstock production;

5           “(B) harvest and handling;

6           “(C) pretreatment or thermochemical proc-  
7       essing;

8           “(D) fermentation;

9           “(E) catalytic processing;

10          “(F) product recovery; and

11          “(G) coproduct production.

12   **“SEC. 1490A. COOPERATION AND COORDINATION IN SUS-**  
13                   **TAINABLE FUELS AND CHEMICALS RE-**  
14                   **SEARCH.**

15       “(a) IN GENERAL.—The Secretary of Agriculture  
16   and the Secretary of Energy shall cooperate with respect  
17   to, and coordinate, policies and procedures that promote  
18   research and development leading to the production of  
19   biobased industrial products.

20       “(b) PURPOSE.—The purpose of the cooperation and  
21   coordination shall be to—

22           “(1) understand the key mechanisms underlying  
23       the recalcitrance of biomass for conversion into  
24       biobased industrial products;

1           “(2) develop new and cost-effective technologies  
2           that would result in large-scale commercial produc-  
3           tion of low cost and sustainable biobased industrial  
4           products;

5           “(3) ensure that biobased industrial products  
6           are developed in a manner that enhances their eco-  
7           nomic, energy security, and environmental benefits;  
8           and

9           “(4) promote the development and use of agri-  
10          cultural and energy crops for conversion into  
11          biobased industrial products.

12          “(c) AREAS.—In carrying out this subtitle, the Sec-  
13         retary of Agriculture and the Secretary of Energy, in con-  
14         sultation with heads of appropriate departments and agen-  
15         cies, shall promote research and development to—

16                 “(1) advance the availability and widespread  
17                 use of energy efficient, economically competitive, and  
18                 environmentally sound biobased industrial products  
19                 in a manner that is consistent with the goals of the  
20                 United States relating to sustainable and secure  
21                 supplies of food, chemicals, and fuel;

22                 “(2) ensure full consideration of Federal land  
23                 and land management programs as potential feed-  
24                 stock resources for biobased industrial products; and



1           “(3) assess the environmental, economic, and  
2           social impact of production of biobased industrial  
3           products from biomass on a large scale.

4           “(d) POINTS OF CONTACT.—

5           “(1) IN GENERAL.—To coordinate research and  
6           development programs and activities relating to  
7           biobased industrial products that are carried out by  
8           their respective Departments—

9           “(A) the Secretary of Agriculture shall  
10          designate, as the point of contact for the De-  
11          partment of Agriculture, an officer of the De-  
12          partment of Agriculture appointed by the Presi-  
13          dent to a position in the Department before the  
14          date of the designation, by and with the advice  
15          and consent of the Senate; and

16          “(B) the Secretary of Energy shall des-  
17          ignate, as the point of contact for the Depart-  
18          ment of Energy, an officer of the Department  
19          of Energy appointed by the President to a posi-  
20          tion in the Department before the date of the  
21          designation, by and with the advice and consent  
22          of the Senate.

23          “(2) DUTIES.—The points of contact shall  
24          jointly—

1           “(A) assist in arranging interlaboratory  
2           and site-specific supplemental agreements for  
3           research, development, and demonstration  
4           projects relating to biobased industrial prod-  
5           ucts;

6           “(B) serve as cochairpersons of the Board;

7           “(C) administer the Initiative; and

8           “(D) respond in writing to each rec-  
9           ommendation of the Advisory Committee made  
10          under section 1490C(c)(2).

11 **“SEC. 1490B. SUSTAINABLE FUELS AND CHEMICALS BOARD.**

12          “(a) ESTABLISHMENT.—There is established the  
13 Sustainable Fuels and Chemicals Board to coordinate pro-  
14 grams within and among departments and agencies of the  
15 Federal Government for the purpose of promoting the use  
16 of biobased industrial products by—

17           “(1) maximizing the benefits deriving from  
18 Federal grants and assistance; and

19           “(2) bringing coherence to Federal strategic  
20 planning.

21          “(b) MEMBERSHIP.—The Board shall consist of:

22           “(1) The point of contact of the Department of  
23 Agriculture designated under section  
24 1490A(d)(1)(A), who shall serve as cochairperson of  
25 the Board.

1           “(2) The point of contact of the Department of  
2       Energy designated under section 1490A(d)(1)(B),  
3       who shall serve as cochairperson of the Board.

4           “(3) A senior officer of each of the following  
5       agencies who is appointed by the head of the agency  
6       and who has a rank that is equivalent to the points  
7       of contact:

8           “(A) The Department of the Interior.

9           “(B) The Environmental Protection Agen-  
10       cy.

11          “(C) The National Science Foundation.

12          “(D) The Office of Science and Technology  
13       Policy.

14          “(4) At the option of the Secretary of Agri-  
15       culture and the Secretary of Energy, other members  
16       appointed by the Secretaries (after consultation with  
17       members described in paragraphs (1) through (3)).

18       “(c) DUTIES.—The Board shall—

19           “(1) coordinate research, development, and  
20       demonstration activities relating to biobased indus-  
21       trial products—

22           “(A) between the Department of Agri-  
23       culture and the Department of Energy; and

24           “(B) with other departments and agencies  
25       of the Federal Government; and

1           “(2) provide recommendations to the points of  
2           contact concerning administration of this subtitle.

3           “(d) FUNDING.—Each agency represented on the  
4 Board is encouraged to provide funds for any purpose  
5 under this subtitle.

6           “(e) MEETINGS.—The Board shall meet at least  
7 quarterly to enable the Board to carry out the duties of  
8 the Board under subsection (c).

9   **“SEC. 1490C. SUSTAINABLE FUELS AND CHEMICALS TECH-**  
10                   **NICAL ADVISORY COMMITTEE.**

11          “(a) ESTABLISHMENT.—There is established the  
12 Sustainable Fuels and Chemicals Technical Advisory  
13 Committee to—

14               “(1) advise the Secretary of Agriculture, the  
15 Secretary of Energy, and the points of contact  
16 concerning—

17                   “(A) the technical focus and direction of  
18 requests for proposals issued under the Initia-  
19 tive; and

20                   “(B) procedures for reviewing and evalu-  
21 ating the proposals;

22               “(2) facilitate consultations and partnerships  
23 among Federal and State agencies, agricultural pro-  
24 ducers, industry, consumers, the research commu-

1 nity, and other interested groups to carry out pro-  
2 gram activities relating to the Initiative; and

3 “(3) evaluate and perform strategic planning on  
4 program activities relating to the Initiative.

5 “(b) MEMBERSHIP.—The Committee shall consist of  
6 the following members appointed by the points of contact:

7 “(1) An individual affiliated with the biobased  
8 industrial products industry.

9 “(2) An individual affiliated with a college or  
10 university who has expertise in biobased industrial  
11 products.

12 “(3) 2 prominent engineers or scientists from  
13 government or academia who have expertise in  
14 biobased industrial products.

15 “(4) An individual affiliated with a commodity  
16 trade association.

17 “(5) An individual affiliated with an environ-  
18 mental or conservation organization.

19 “(6) An individual associated with State gov-  
20 ernment who has expertise in biobased industrial  
21 products.

22 “(7) At the option of the points of contact,  
23 other members.

24 “(c) DUTIES.—The Advisory Committee shall—

1 “(1) advise the points of contact with respect to  
2 the Initiative; and

3 “(2) evaluate whether, and make recommenda-  
4 tions in writing to the Board to ensure that—

5 “(A) funds authorized for the Initiative are  
6 distributed and used in a manner that is con-  
7 sistent with the goals of the Initiative;

8 “(B) the points of contact are funding pro-  
9 posals under this subtitle that are selected on  
10 the basis of merit, as determined by an inde-  
11 pendent panel of scientific and technical peers;  
12 and

13 “(C) activities under this subtitle are car-  
14 ried out in accordance with this subtitle.

15 “(d) MEETINGS.—The Advisory Committee shall  
16 meet at least quarterly to enable the Advisory Committee  
17 to carry out the duties of the Advisory Committee under  
18 subsection (c).

19 **“SEC. 1490D. SUSTAINABLE FUELS AND CHEMICALS RE-**  
20 **SEARCH INITIATIVE.**

21 “(a) IN GENERAL.—The Secretary of Agriculture  
22 and the Secretary of Energy, acting through their respec-  
23 tive points of contact and in consultation with the Board,  
24 shall establish and carry out a Sustainable Fuels and  
25 Chemicals Research Initiative under which competitively-

1 awarded grants, contracts, and financial assistance are  
2 provided to, or entered into with, eligible entities to carry  
3 out research on biobased industrial products.

4 “(b) PURPOSES.—The purposes of grants, contracts,  
5 and assistance under this section shall be to—

6 “(1) stimulate collaborative activities by a di-  
7 verse range of experts in all aspects of biomass proc-  
8 essing for the purpose of conducting fundamental  
9 and innovation-targeted research and technology de-  
10 velopment;

11 “(2) enhance creative and imaginative ap-  
12 proaches toward biomass processing that will serve  
13 to develop the next generation of advanced tech-  
14 nologies making possible low cost and sustainable  
15 biobased industrial products;

16 “(3) strengthen the intellectual resources of the  
17 United States through the training and education of  
18 future scientists, engineers, managers, and business  
19 leaders in the field of biomass processing; and

20 “(4) promote integrated research partnerships  
21 among colleges, universities, national laboratories,  
22 Federal and State research agencies, and the private  
23 sector as the best means of overcoming technical  
24 challenges that span multiple research and engineer-

1 ing disciplines and of gaining better leverage from  
2 limited Federal research funds.

3 “(c) ELIGIBLE ENTITIES.—

4 “(1) IN GENERAL.—To be eligible for a grant,  
5 contract, or assistance under this section, an appli-  
6 cant shall be—

7 “(A) a college or university;

8 “(B) a national laboratory;

9 “(C) a Federal research agency;

10 “(D) a State research agency;

11 “(E) a private sector entity;

12 “(F) a nonprofit organization; or

13 “(G) a consortium of 2 or more entities de-  
14 scribed in subparagraphs (A) through (E).

15 “(2) ADMINISTRATION.—After consultation  
16 with the Board, the points of contact, on behalf of  
17 the Board, shall—

18 “(A) publish annually 1 or more joint re-  
19 quests for proposals for grants, contracts, and  
20 assistance under this section;

21 “(B) establish a priority in grants, con-  
22 tracts, and assistance under this section for re-  
23 search that—

24 “(i) demonstrates potential for signifi-  
25 cant advances in biomass processing;



1 “(ii) demonstrates potential to sub-  
2 stantially impact scale-sensitive national  
3 objectives such as sustainable resource  
4 supply, reduced greenhouse gas emissions,  
5 healthier rural economies, and improved  
6 strategic security and trade balances; and

7 “(iii) would improve knowledge of im-  
8 portant biomass processing systems that  
9 demonstrate potential for commercial ap-  
10 plications;

11 “(C) require that grants, contracts, and  
12 assistance under this section be awarded com-  
13 petitively, on the basis of merit, after the estab-  
14 lishment of procedures that provide for sci-  
15 entific peer review by an independent panel of  
16 scientific and technical peers; and

17 “(D) give preference to applications that—

18 “(i) involve a consortia of experts  
19 from multiple institutions; and

20 “(ii) encourage the integration of dis-  
21 ciplines and application of the best tech-  
22 nical resources.

23 “(d) USES OF GRANTS, CONTRACTS, AND ASSIST-  
24 ANCE.—A grant, contract, or assistance under this section  
25 shall be used to conduct—

1 “(1) research on process technology for over-  
2 coming the recalcitrance of biomass, including re-  
3 search on key mechanisms, advanced technologies,  
4 and demonstration test beds for—

5 “(A) feedstock pretreatment and hydrolysis  
6 of cellulose and hemicellulose, including new  
7 technologies for—

8 “(i) enhanced sugar yields;

9 “(ii) lower overall chemical use;

10 “(iii) less costly materials; and

11 “(iv) cost reduction;

12 “(B) development of novel organisms and  
13 other approaches to substantially lower the cost  
14 of cellulase enzymes and enzymatic hydrolysis,  
15 including dedicated cellulase production and  
16 consolidated bioprocessing strategies; and

17 “(C) approaches other than enzymatic hy-  
18 drolysis for overcoming the recalcitrance of cel-  
19 lulosic biomass;

20 “(2) research on technologies for diversifying  
21 the range of products than can be efficiently and  
22 cost-competitively produced from biomass, including  
23 research on—

24 “(A) metabolic engineering of biological  
25 systems (including the safe use of genetically

1 modified crops) to produce novel products, espe-  
2 cially commodity products, or to increase prod-  
3 uct selectivity and tolerance, with a research  
4 priority on the development of biobased prod-  
5 ucts that can compete in performance and cost  
6 with fossil-based products;

7 “(B) catalytic processing to convert inter-  
8 mediates of biomass processing into products of  
9 interest;

10 “(C) separation technologies for cost-effec-  
11 tive product recovery and purification;

12 “(D) approaches other than metabolic en-  
13 gineering and catalytic conversion of intermedi-  
14 ates of biomass processing;

15 “(E) advanced biomass gasification tech-  
16 nologies, including coproduction of power and  
17 heat as an integrated component of biomass  
18 processing, with the possibility of generating ex-  
19 cess electricity for sale; and

20 “(F) related research in advanced turbine  
21 and stationary fuel cell technology for produc-  
22 tion of electricity from biomass; and

23 “(3) research aimed at ensuring the environ-  
24 mental performance and economic viability of  
25 biobased industrial products and their raw material

1 input of biomass when considered as an integrated  
2 system, including research on—

3 “(A) the analysis of, and strategies to en-  
4 hance, the environmental performance and sus-  
5 tainability of biobased industrial products, in-  
6 cluding research on—

7 “(i) accurate measurement and anal-  
8 ysis of greenhouse gas emissions, carbon  
9 sequestration, and carbon cycling in rela-  
10 tion to the life cycle of biobased industrial  
11 products and feedstocks with respect to  
12 other alternatives;

13 “(ii) evaluation of current and future  
14 biomass resource availability;

15 “(iii) development and analysis of  
16 land management practices and alternative  
17 biomass cropping systems that ensure the  
18 environmental performance and sustain-  
19 ability of biomass production and har-  
20 vesting;

21 “(iv) land, air, water, and biodiversity  
22 impacts of large-scale biomass production,  
23 processing, and use of biobased industrial  
24 products relative to other alternatives; and

1 “(v) biomass gasification and combus-  
2 tion to produce electricity;

3 “(B) the analysis of, and strategies to en-  
4 hance, the economic viability of biobased indus-  
5 trial products, including research on—

6 “(i) the cost of the required process  
7 technology;

8 “(ii) the impact of coproducts, includ-  
9 ing power and heat generation, on biobased  
10 industrial product price and large-scale  
11 economic viability; and

12 “(iii) interactions between an emer-  
13 gent biomass refining industry and the pe-  
14 trochemical refining infrastructure; and

15 “(C) the field and laboratory research re-  
16 lated to feedstock production with the inter-  
17 related goals of enhancing the sustainability, in-  
18 creasing productivity, and decreasing the cost of  
19 biomass processing, including research on—

20 “(i) altering biomass to make biomass  
21 easier and less expensive to process;

22 “(ii) existing and new agricultural and  
23 energy crops that provide a sustainable re-  
24 source for conversion to biobased industrial  
25 products while simultaneously serving as a

1 source for coproducts such as food, animal  
2 feed, and fiber;

3 “(iii) improved technologies for har-  
4 vest, collection, transport, storage, and  
5 handling of crop and residue feedstocks;  
6 and

7 “(iv) development of economically via-  
8 ble cropping systems that improve the con-  
9 servation and restoration of marginal land.

10 “(e) AUTHORIZATION OF APPROPRIATIONS.—In ad-  
11 dition to any other amounts that are authorized to be ap-  
12 propriated, there are authorized to be appropriated to  
13 carry out this section \$49,000,000 for each of fiscal years  
14 2000 through 2005.

15 **“SEC. 1490E. ADMINISTRATIVE SUPPORT AND FUNDS.**

16 “(a) IN GENERAL.—To the extent administrative  
17 support and funds are not provided by other agencies  
18 under subsection (b), the Secretary of Energy shall pro-  
19 vide such administrative support and funds of the Depart-  
20 ment of Energy to the Board and the Advisory Committee  
21 as are necessary to enable the Board and the Advisory  
22 Committee to carry out this subtitle.

23 “(b) OTHER AGENCIES.—The Secretary of Agri-  
24 culture and the heads of the agencies referred to in section  
25 1490B(a)(3) may, and are encouraged to, provide admin-

1 istrative support and funds of their respective agencies to  
2 the Board and the Advisory Committee.

3 **“SEC. 1490F. REPORTS.**

4 “For each fiscal year that funds are made available  
5 to carry out this subtitle, the Secretary of Agriculture and  
6 the Secretary of Energy shall jointly transmit to Congress  
7 a detailed report on—

8 “(1) the status and progress of the Initiative,  
9 including a certification from the Board that funds  
10 authorized for the Initiative are distributed and used  
11 in a manner that is consistent with the goals of the  
12 Initiative; and

13 “(2) the general status of cooperation and re-  
14 search efforts carried out by each Secretary with re-  
15 spect to sustainable fuels, chemicals, and electricity  
16 derived from biomass, including a certification from  
17 the Board that the points of contact are funding  
18 proposals that are selected on the basis of merit, as  
19 determined by an independent panel of scientific and  
20 technical peers.

21 **“SEC. 1490G. AUTHORIZATION OF APPROPRIATIONS FOR**  
22 **ETHANOL RESEARCH PILOT PLANT.**

23 “There are authorized to be appropriated to con-  
24 struct a Department of Agriculture corn-based ethanol re-

- 1 search pilot plant a total of \$14,000,000 for fiscal year
- 2 2000 and subsequent fiscal years.”.

