

Calendar No. 310

106TH CONGRESS
1ST SESSION

S. 935

[Report No. 106-179]

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.

OCTOBER 8, 1999

Reported with an amendment

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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.

IN THE SENATE OF THE UNITED STATES

APRIL 30, 1999

Mr. LUGAR (for himself, Mr. CHAFEE, Mr. HARKIN, Mr. JEFFORDS, Mr. MURKOWSKI, Mr. ALLARD, Mr. DASCHLE, Mr. DOMENICI, Mr. KERREY, Mr. LEAHY, Mr. LIEBERMAN, Mr. CRAIG, Mr. GRASSLEY, Mr. JOHNSON, Mr. FITZGERALD, Mr. DURBIN, Mr. KERRY, Mr. BAYH, Mr. BURNS, and Mr. BINGAMAN) introduced the following bill; which was read twice and referred to the Committee on Agriculture, Nutrition, and Forestry

OCTOBER 8, 1999

Reported by Mr. LUGAR, with an amendment

[Strike out all after the enacting clause and insert the part printed in italic]

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,*

1 **SECTION 1. SHORT TITLE.**

2 This Act may be cited as the “National Sustainable
3 Fuels and Chemicals Act of 1999”.

4 **SEC. 2. FINDINGS.**

5 Congress finds that—

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

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

15 (B) the key technical challenge to be overcome
16 in order for biobased industrial products to be cost
17 competitive is reducing the cost of technology for
18 converting biomass into desired biobased industrial
19 products;

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

25 (4) biobased chemicals—

1 (A) can provide functional replacements
2 for essentially all organic chemicals that are
3 currently derived from petroleum; and

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

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

10 (6)(A) grain processing mills are biorefineries
11 that produce a diversity of useful food, chemical,
12 feed, and fuel products; and

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

17 (7)(A) cellulosic feedstocks are attractive be-
18 cause of their low cost and widespread availability;
19 and

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

1 (8) research into the fundamentals to under-
2 stand important mechanisms of biomass conversion
3 processes can be expected to accelerate the applica-
4 tion and advancement of biomass processing tech-
5 nology by—

6 (A) increasing the confidence and speed
7 with which new technologies can be scaled up;
8 and

9 (B) giving rise to processing innovations
10 based on new knowledge;

11 (9) the utility of biotechnology allows the design
12 of feedstocks that will meet future needs more effec-
13 tively;

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

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

1 (11) several prominent studies, including stud-
 2 ies by the President’s Council of Advisors on Science
 3 and Technology and the National Research Council,
 4 support the potential for large research-driven ad-
 5 vances in technologies for production of biobased in-
 6 dustrial products as well as associated benefits.

7 **SEC. 3. CONVERSION OF BIOMASS INTO BIOBASED INDUS-**
 8 **TRIAL PRODUCTS.**

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

12 **“Subtitle N—Conversion of Bio-**
 13 **mass Into Biobased Industrial**
 14 **Products**

15 **“SEC. 1490. DEFINITIONS.**

16 “In this subtitle:

17 “(1) **ADVISORY COMMITTEE.**—The term ‘Advi-
 18 sory Committee’ means the Sustainable Fuels and
 19 Chemicals Technical Advisory Committee established
 20 by section 1490C.

21 “(2) **BIOBASED INDUSTRIAL PRODUCT.**—The
 22 term ‘biobased industrial product’ means any power,
 23 fuel, feed, chemical product, or other consumer good
 24 derived from biomass.

1 “(3) BIOMASS.—The term ‘biomass’ means any
2 organic matter that is available on a renewable or
3 recurring basis, including plants, trees, grasses, agri-
4 cultural crops and residues, wood and wood residues,
5 municipal waste, animal waste and residues, and
6 aquatic plants.

7 “(4) BOARD.—The term ‘Board’ means the
8 Sustainable Fuels and Chemicals Board established
9 by section 1490B.

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

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

16 **“SEC. 1490A. COOPERATION AND COORDINATION IN SUS-**
17 **TAINABLE FUELS AND CHEMICALS RE-**
18 **SEARCH.**

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

1 “(b) PURPOSE.—The purpose of the cooperation and
2 coordination shall be to promote research and development
3 related to—

4 “(1) understanding the key mechanisms under-
5 lying the recalcitrance of biomass for conversion into
6 biobased industrial products, including the use of ag-
7 ricultural crops for conversion into biobased indus-
8 trial products; and

9 “(2) advanced technologies that will result in
10 large-scale commercial production of low cost
11 biobased industrial products.

12 “(c) AREAS.—In carrying out this subtitle, the Sec-
13 retary of Agriculture and the Secretary of Energy shall
14 promote research and development to—

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

21 “(2) ensure full consideration of Federal land
22 and land management programs as potential feed-
23 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 planning.

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

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

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

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

5 ~~“(1) An individual affiliated with the biobased~~
6 ~~industrial products industry.~~

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

10 ~~“(3) 2 prominent engineers or scientists who~~
11 ~~have expertise in biobased industrial products.~~

12 ~~“(4) An individual affiliated with a commodity~~
13 ~~trade association.~~

14 ~~“(5) An individual affiliated with an environ-~~
15 ~~mental or conservation organization.~~

16 ~~“(6) At the option of the points of contact,~~
17 ~~other members.~~

18 ~~“(c) DUTIES.—The Advisory Committee shall—~~

19 ~~“(1) advise the points of contact with respect to~~
20 ~~the Initiative; and~~

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

23 ~~“(A) funds authorized for the Initiative are~~
24 ~~distributed and used in a manner that is con-~~
25 ~~sistent with the goals of the Initiative;~~

1 “(B) the points of contact are funding pro-
 2 posals under this subtitle that are selected on
 3 the basis of merit, as determined by an inde-
 4 pendent panel of scientific and technical peers;
 5 and

6 “(C) activities under this subtitle are ear-
 7 ried out in accordance with this subtitle.

8 “(d) MEETINGS.—The Advisory Committee shall
 9 meet at least quarterly to enable the Advisory Committee
 10 to carry out the duties of the Advisory Committee under
 11 subsection (c).

12 **“SEC. 1490D. SUSTAINABLE FUELS AND CHEMICALS RE-**
 13 **SEARCH INITIATIVE.**

14 “(a) IN GENERAL.—The Secretary of Agriculture
 15 and the Secretary of Energy, acting through their respec-
 16 tive points of contact and in consultation with the Board,
 17 shall establish and carry out a Sustainable Fuels and
 18 Chemicals Research Initiative under which competitively-
 19 awarded grants, contracts, and financial assistance are
 20 provided to, or entered into with, eligible entities to carry
 21 out research on biobased industrial products.

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

24 “(1) stimulate collaborative activities by a di-
 25 verse range of experts in all aspects of biomass proc-

1 essing for the purpose of conducting fundamental
2 and innovation-targeted research and technology de-
3 velopment;

4 “(2) enhance creative and imaginative ap-
5 proaches toward biomass processing that will serve
6 to develop the next generation of advanced tech-
7 nologies making possible low cost biobased industrial
8 products;

9 “(3) strengthen the intellectual resources of the
10 United States through the training and education of
11 future scientists, engineers, managers, and business
12 leaders in the field of biomass processing; and

13 “(4) promote integrated research partnerships
14 among colleges, universities, national laboratories,
15 Federal research agencies, and the private sector as
16 the best means of overcoming technical challenges
17 that span multiple academic disciplines and
18 leveraging scarce Federal research funds.

19 “(c) ELIGIBLE ENTITIES.—

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

23 “(A) a college or university;

24 “(B) a national laboratory;

25 “(C) a Federal research agency;

1 “(D) a State research agency;

2 “(E) a private sector entity; or

3 “(F) a consortium of 2 or more entities de-
4 scribed in subparagraphs (A) through (E).

5 “(2) ADMINISTRATION.—After consultation
6 with the Board, the points of contact shall—

7 “(A) publish annually a joint request for
8 proposals for grants, contracts, and assistance
9 under this section;

10 “(B) provide a preference in grants, con-
11 tracts, and assistance under this section to con-
12 sortia involving experts from multiple institu-
13 tions and multiple academic disciplines working
14 on cross-cutting or integrative research, devel-
15 opment, and demonstration challenges; and

16 “(C) require that grants, contracts, and
17 assistance under this section be awarded com-
18 petitively after the establishment of procedures
19 that provide for scientific peer review by an
20 independent panel of scientific and technical
21 peers.

22 “(d) USES OF GRANTS, CONTRACTS, AND ASSIST-
23 ANCE.—A grant, contract, or assistance under this section
24 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) novel organism development and cel-
13 lulose production, including consolidated bio-
14 processing techniques; and

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

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

22 “(A) metabolic engineering of biological
23 systems (including genetically modified crops)
24 to produce novel products, especially commodity
25 products, or to increase product selectivity and

1 tolerance, with a research priority on the devel-
2 opment of biobased products that can compete
3 in performance and cost with fossil-based prod-
4 ucts;

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

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

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

13 “(E) advanced technologies for biomass
14 gasification and related research in turbine and
15 stationary fuel cell technology for production of
16 electricity from biomass and related research in
17 advanced turbine and stationary fuel cell tech-
18 nology; and

19 “(3) research aimed at evaluating the sustain-
20 ability and economic viability of biobased industrial
21 products and their raw material input of biomass,
22 including research on—

23 “(A) the evaluation of, and strategies to
24 enhance, the sustainability of biomass-based

1 production of fuels and commodity chemicals,
2 including research on—

3 “(i) accurate measurement and anal-
4 ysis of carbon sequestration and carbon cy-
5 cling in relation to biobased industrial
6 products and feedstocks;

7 “(ii) crops that provide a sustainable
8 resource for conversion to industrial prod-
9 ucts while also serving as a source for
10 other needs such as food or animal feed;

11 “(iii) development and analysis of best
12 land management practices that enhance
13 the environmental sustainability of the pro-
14 duction and harvesting of biomass;

15 “(iv) development of biomass cropping
16 systems that improve the conservation and
17 use of marginal land; and

18 “(v) biomass gasification and combus-
19 tion to produce electricity; and

20 “(B) the evaluation of, and strategies to
21 enhance, the economic viability of fuels and
22 commodity chemicals produced from biomass,
23 including research on—

24 “(i) the evaluation of the energy bal-
25 ances for biorefineries;

1 “(ii) the cost of the required process
2 technology; and

3 “(iii) the impact of coproduction on
4 product price and large-scale economic via-
5 bility.

6 “(e) AUTHORIZATION OF APPROPRIATIONS.—

7 “(1) IN GENERAL.—In addition to any other
8 amounts that are authorized to be appropriated,
9 there are authorized to be appropriated to carry out
10 this section \$49,000,000 for each of fiscal years
11 2000 through 2005.

12 “(2) RESEARCH ON CELLULOSIC BIOMASS.—

13 For each fiscal year, of the amounts that are made
14 available under paragraph (1), not less than 30 per-
15 cent shall be used to conduct research described in
16 subsection (d)(1).

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

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

1 “(b) OTHER AGENCIES.—The Secretary of Agri-
2 culture and the heads of the agencies referred to in section
3 1490B(a)(3) may, and are encouraged to, provide admin-
4 istrative support and funds of their respective agencies to
5 the Board and the Advisory Committee.

6 **“SEC. 1490F. REPORTS.**

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

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

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

1 **SECTION 1. SHORT TITLE.**

2 *This Act may be cited as the “National Sustainable*
3 *Fuels and Chemicals Act of 1999”.*

4 **SEC. 2. FINDINGS.**

5 *Congress finds that—*

6 *(1) conversion of biomass into biobased indus-*
7 *trial products offers outstanding potential for benefit*
8 *to the national interest through improved strategic se-*
9 *curity and balance of payments, healthier rural*
10 *economies, improved environmental quality, near-zero*
11 *net greenhouse gas emissions, technology export, and*
12 *sustainable resource supply;*

13 *(2)(A) biomass is widely available at prices that*
14 *are competitive with low cost petroleum; and*

15 *(B) the key technical challenges to be overcome in*
16 *order for biobased industrial products to be cost com-*
17 *petitive are finding new technology and reducing the*
18 *cost of technology for converting biomass into desired*
19 *biobased industrial products;*

20 *(3) biobased fuels, such as ethanol, have the clear*
21 *potential to be sustainable, low cost, and high per-*
22 *formance fuels that are compatible with both current*
23 *and future transportation systems and provide near*
24 *zero net greenhouse gas emissions;*

25 *(4) biobased chemicals—*

1 (A) can provide functional replacements for
2 essentially all organic chemicals that are cur-
3 rently derived from petroleum; and

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

6 (5) biobased power can provide environmental
7 benefits, promote rural economic development, and di-
8 versify energy resource options;

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

13 (7)(A) grain processing mills are biorefineries
14 that produce a diversity of useful food, chemical, feed,
15 and fuel products; and

16 (B) technologies that result in further diversifica-
17 tion of the range of value-added biobased industrial
18 products can meet a key need for the grain processing
19 industry;

20 (8)(A) cellulosic feedstocks are attractive because
21 of their low cost and widespread availability; and

22 (B) research resulting in cost-effective technology
23 to overcome the recalcitrance of cellulosic biomass
24 would allow biorefineries to produce fuels and bulk
25 chemicals on a very large scale, with a commen-

1 *surately large realization of the benefit described in*
2 *paragraph (1);*

3 *(9) research into the fundamentals to understand*
4 *important mechanisms of biomass conversion can be*
5 *expected to accelerate the application and advance-*
6 *ment of biomass processing technology by—*

7 *(A) increasing the confidence and speed*
8 *with which new technologies can be scaled up;*
9 *and*

10 *(B) giving rise to processing innovations*
11 *based on new knowledge;*

12 *(10) the added utility of biobased industrial*
13 *products developed through improvements in proc-*
14 *essing technology would encourage the design of feed-*
15 *stocks that would meet future needs more effectively;*

16 *(11) the creation of value-added biobased indus-*
17 *trial products would create new jobs in construction,*
18 *manufacturing, and distribution, as well as new high-*
19 *er-valued exports of products and technology;*

20 *(12)(A) because of the relatively short-term time*
21 *horizon characteristic of private sector investments,*
22 *and because many benefits of biomass processing are*
23 *in the national interest, it is appropriate for the Fed-*
24 *eral Government to provide precommercial investment*

1 *in fundamental research and research-driven innova-*
 2 *tion in the biomass processing area; and*

3 *(B) such an investment would provide a valuable*
 4 *complement to ongoing and past governmental sup-*
 5 *port in the biomass processing area; and*

6 *(13) several prominent studies, including studies*
 7 *by the President’s Council of Advisors on Science and*
 8 *Technology and the National Research Council—*

9 *(A) support the potential for large research-*
 10 *driven advances in technologies for production of*
 11 *biobased industrial products as well as associ-*
 12 *ated benefits; and*

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

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

19 *The National Agricultural Research, Extension, and*
 20 *Teaching Policy Act of 1977 (7 U.S.C. 3101 et seq.) is*
 21 *amended by adding at the end the following:*

22 **“Subtitle N—Conversion of Biomass**
 23 **Into Biobased Industrial Products**

24 **“SEC. 1490. DEFINITIONS.**

25 *“In this subtitle:*

1 “(1) *ADVISORY COMMITTEE.*—*The term ‘Advisory Committee’ means the Sustainable Fuels and*
2 *Chemicals Technical Advisory Committee established*
3 *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 re-*
11 *curring basis (excluding old growth timber), includ-*
12 *ing dedicated energy crops and trees, wood and wood*
13 *residues, plants (including aquatic plants), grasses,*
14 *agricultural crops, residues, fibers, and animal wastes*
15 *and other waste materials.*

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

19 “(5) *INITIATIVE.*—*The term ‘Initiative’ means*
20 *the Sustainable Fuels and Chemicals Research Initia-*
21 *tive 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’ means
2 the derivation of biobased industrial products from
3 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 and
16 the Secretary of Energy shall cooperate with respect to, and
17 coordinate, policies and procedures that promote research
18 and development leading to the production of biobased in-
19 dustrial 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 are
6 developed in a manner that enhances their economic,
7 energy security, and environmental benefits; and

8 “(4) promote the development and use of agricul-
9 tural and energy crops for conversion into biobased
10 industrial products.

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

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

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

1 “(3) *assess the environmental, economic, and so-*
2 *cial impact of production of biobased industrial prod-*
3 *ucts 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 des-*
10 *ignate, as the point of contact for the Depart-*
11 *ment of Agriculture, an officer of the Department*
12 *of Agriculture appointed by the President to a*
13 *position in the Department before the date of the*
14 *designation, by and with the advice and consent*
15 *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 of*
19 *Energy appointed by the President to a position*
20 *in the Department before the date of the designa-*
21 *tion, by and with the advice and consent of the*
22 *Senate.*

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

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

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

6 “(C) administer the Initiative; and

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

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

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

16 “(1) maximizing the benefits deriving from Fed-
17 eral grants and assistance; and

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

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

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

1 “(2) *The point of contact of the Department of*
2 *Energy designated under section 1490A(d)(1)(B), who*
3 *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 Agency.*

10 “(C) *The National Science Foundation.*

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

13 “(4) *At the option of the Secretary of Agriculture*
14 *and the Secretary of Energy, other members ap-*
15 *pointed by the Secretaries (after consultation with*
16 *members described in paragraphs (1) through (3)).*

17 “(c) *DUTIES.—The Board shall—*

18 “(1) *coordinate research, development, and dem-*
19 *onstration activities relating to biobased industrial*
20 *products—*

21 “(A) *between the Department of Agriculture*
22 *and the Department of Energy; and*

23 “(B) *with other departments and agencies*
24 *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 quar-*
7 *terly to enable the Board to carry out the duties of the*
8 *Board under subsection (c).*

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

11 “(a) *ESTABLISHMENT.—There is established the Sus-*
12 *tainable Fuels and Chemicals Technical Advisory Com-*
13 *mittee to—*

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

17 “*(A) the technical focus and direction of re-*
18 *quests for proposals issued under the Initiative;*
19 *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 community,*

1 *and other interested groups to carry out program ac-*
2 *tivities 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 govern-*
20 *ment who has expertise in biobased industrial prod-*
21 *ucts.*

22 “(7) *At the option of the points of contact, other*
23 *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 the
10 basis of merit, as determined by an independent
11 panel of scientific and technical peers; and

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

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

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

20 “(a) IN GENERAL.—The Secretary of Agriculture and
21 the Secretary of Energy, acting through their respective
22 points of contact and in consultation with the Board, shall
23 establish and carry out a Sustainable Fuels and Chemicals
24 Research Initiative under which competitively-awarded
25 grants, contracts, and financial assistance are provided to,

1 *or entered into with, eligible entities to carry out research*
2 *on biobased industrial products.*

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

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

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

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

19 “(4) *promote integrated research partnerships*
20 *among colleges, universities, national laboratories,*
21 *Federal and State research agencies, and the private*
22 *sector as the best means of overcoming technical chal-*
23 *lenges that span multiple research and engineering*
24 *disciplines and of gaining better leverage from limited*
25 *Federal research funds.*

1 “(c) *ELIGIBLE ENTITIES.*—

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

5 “(A) *a college or university;*

6 “(B) *a national laboratory;*

7 “(C) *a Federal research agency;*

8 “(D) *a State research agency;*

9 “(E) *a private sector entity;*

10 “(F) *a nonprofit organization; or*

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

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

16 “(A) *publish annually 1 or more joint re-*
17 *quests for proposals for grants, contracts, and as-*
18 *sistance under this section;*

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

22 “(i) *demonstrates potential for signifi-*
23 *cant advances in biomass processing;*

24 “(ii) *demonstrates potential to substan-*
25 *tially impact scale-sensitive national objec-*

1 *tives such as sustainable resource supply,*
 2 *reduced greenhouse gas emissions, healthier*
 3 *rural economies, and improved strategic se-*
 4 *curity and trade balances; and*

5 *“(iii) would improve knowledge of im-*
 6 *portant biomass processing systems that*
 7 *demonstrate potential for commercial appli-*
 8 *cations;*

9 *“(C) require that grants, contracts, and as-*
 10 *sistance under this section be awarded competi-*
 11 *tively, on the basis of merit, after the establish-*
 12 *ment of procedures that provide for scientific*
 13 *peer review by an independent panel of scientific*
 14 *and technical peers; and*

15 *“(D) give preference to applications that—*

16 *“(i) involve a consortia of experts from*
 17 *multiple institutions; and*

18 *“(ii) encourage the integration of dis-*
 19 *ciplines and application of the best tech-*
 20 *nical resources.*

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

24 *“(1) research on process technology for over-*
 25 *coming the recalcitrance of biomass, including re-*

1 search on key mechanisms, advanced technologies, and
2 demonstration test beds for—

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

6 “(i) enhanced sugar yields;

7 “(ii) lower overall chemical use;

8 “(iii) less costly materials; and

9 “(iv) cost reduction;

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

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

18 “(2) research on technologies for diversifying the
19 range of products that can be efficiently and cost-com-
20 petitively produced from biomass, including research
21 on—

22 “(A) metabolic engineering of biological sys-
23 tems (including the safe use of genetically modi-
24 fied crops) to produce novel products, especially
25 commodity products, or to increase product selec-

1 *tivity and tolerance, with a research priority on*
2 *the development of biobased products that can*
3 *compete in performance and cost with fossil-*
4 *based products;*

5 *“(B) catalytic processing to convert inter-*
6 *mediates of biomass processing into products of*
7 *interest;*

8 *“(C) separation technologies for cost-effec-*
9 *tive product recovery and purification;*

10 *“(D) approaches other than metabolic engi-*
11 *neering and catalytic conversion of intermediates*
12 *of biomass processing;*

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

18 *“(F) related research in advanced turbine*
19 *and stationary fuel cell technology for production*
20 *of electricity from biomass; and*

21 *“(3) research aimed at ensuring the environ-*
22 *mental performance and economic viability of*
23 *biobased industrial products and their raw material*
24 *input of biomass when considered as an integrated*
25 *system, including research on—*

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

5 “(i) accurate measurement and anal-
6 ysis of greenhouse gas emissions, carbon se-
7 questration, and carbon cycling in relation
8 to the life cycle of biobased industrial prod-
9 ucts and feedstocks with respect to other al-
10 ternatives;

11 “(ii) evaluation of current and future
12 biomass resource availability;

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

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

23 “(v) biomass gasification and combus-
24 tion to produce electricity;

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

4 “(i) the cost of the required process
5 technology;

6 “(ii) the impact of coproducts, includ-
7 ing power and heat generation, on biobased
8 industrial product price and large-scale eco-
9 nomic viability; and

10 “(iii) interactions between an emergent
11 biomass refining industry and the petro-
12 chemical refining infrastructure; and

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

18 “(i) altering biomass to make biomass
19 easier and less expensive to process;

20 “(ii) existing and new agricultural
21 and energy crops that provide a sustainable
22 resource for conversion to biobased indus-
23 trial products while simultaneously serving
24 as a source for coproducts such as food, ani-
25 mal feed, and fiber;

1 “(iii) improved technologies for har-
2 vest, collection, transport, storage, and han-
3 dling of crop and residue feedstocks; and

4 “(iv) development of economically via-
5 ble cropping systems that improve the con-
6 servation and restoration of marginal land.

7 “(e) *AUTHORIZATION OF APPROPRIATIONS.*—*In addi-*
8 *tion to any other amounts that are authorized to be appro-*
9 *priated, there are authorized to be appropriated to carry*
10 *out this section \$49,000,000 for each of fiscal years 2000*
11 *through 2005.*

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

13 “(a) *IN GENERAL.*—*To the extent administrative sup-*
14 *port and funds are not provided by other agencies under*
15 *subsection (b), the Secretary of Energy shall provide such*
16 *administrative support and funds of the Department of En-*
17 *ergy to the Board and the Advisory Committee as are nec-*
18 *essary to enable the Board and the Advisory Committee to*
19 *carry out this subtitle.*

20 “(b) *OTHER AGENCIES.*—*The Secretary of Agriculture*
21 *and the heads of the agencies referred to, or appointed*
22 *under, paragraphs (3) and (4) of section 1490B(a) may,*
23 *and are encouraged to, provide administrative support and*
24 *funds of their respective agencies to the Board and the Advi-*
25 *sory Committee.*

1 **“SEC. 1490F. REPORTS.**

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

6 *“(1) the status and progress of the Initiative, in-*
7 *cluding a certification from the Board that funds au-*
8 *thorized for the Initiative are distributed and used in*
9 *a manner that is consistent with the goals of the Ini-*
10 *tiative; and*

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

19 **“SEC. 1490G. AUTHORIZATION OF APPROPRIATIONS FOR**
20 **ETHANOL RESEARCH PILOT PLANT.**

21 *“There are authorized to be appropriated to construct*
22 *a Department of Agriculture corn-based ethanol research*
23 *pilot plant a total of \$14,000,000 for fiscal year 2000 and*
24 *subsequent fiscal years.”.*

1 **SEC. 4. USE OF CONSERVATION RESERVE LAND FOR RE-**
 2 **COVERY OF BIOMASS USED IN ENERGY PRO-**
 3 **DUCTION.**

4 *Section 1232(a)(7) of the Food Security Act of 1985*
 5 *(16 U.S.C. 3832(a)(7)) is amended—*

6 *(1) by striking “except that the Secretary may*
 7 *permit harvesting” and inserting “except that the*
 8 *Secretary—*

9 *“(A) may permit—*

10 *“(i) harvesting”;*

11 *(2) by striking “emergency, and the Secretary*
 12 *may permit limited” and inserting “emergency; and*

13 *“(ii) limited”;*

14 *(3) by inserting “and” after the semicolon at the*
 15 *end; and*

16 *(4) by adding at the end the following:*

17 *“(B) shall approve not more than 18*
 18 *projects under which crops on land subject to the*
 19 *contract may be harvested for recovery of bio-*
 20 *mass used in energy production if—*

21 *“(i) no acreage subject to the contract*
 22 *is harvested more than once every other*
 23 *year;*

24 *“(ii) not more than 25 percent of the*
 25 *total acreage enrolled in the program under*
 26 *this subchapter in any crop reporting dis-*

1 *strict (as designated by the Secretary), is*
2 *harvested in any 1 year;*

3 *“(iii) no portion of the crop is used for*
4 *any commercial purpose other than energy*
5 *production from biomass;*

6 *“(iv) no wetland, or acreage of any*
7 *type enrolled in a partial field conservation*
8 *practice (including riparian forest buffers,*
9 *filter strips, and buffer strips), is harvested;*

10 *“(v) the owner or operator agrees to a*
11 *payment reduction under this section in an*
12 *amount determined by the Secretary;*

13 *“(vi) the owner or operator agrees to*
14 *commission and submit to the Secretary a*
15 *study and report, to be conducted and writ-*
16 *ten by a third party approved by the Sec-*
17 *retary, on the impact of the biomass pro-*
18 *duction and harvesting on wildlife; and*

19 *“(vii) the owner or operator agrees to*
20 *such other terms and conditions as the Sec-*
21 *retary, in consultation with the State tech-*
22 *anical committee for the State and appro-*
23 *priate conservation and wildlife advocates,*
24 *may establish to ensure that the production*
25 *and harvesting of biomass crops minimize*

1 *disturbance of wildlife habitat and are oth-*
2 *erwise consistent with the purposes of the*
3 *program established under this subchapter,*
4 *with any biomass harvesting project per-*
5 *mitted to harvest at least 50,000 acres per*
6 *year.”.*