106TH CONGRESS
2D SESSION

S. 935

AN ACT

To authorize research to promote the conversion of biomass into biobased industrial products, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

TITLE I—BIOMASS RESEARCH AND DEVELOPMENT ACT OF 2000

SEC. 101. SHORT TITLE.

This title may be cited as the ''Biomass Research and Development Act of 2000''.

SEC. 102. FINDINGS.

Congress finds that—

(1) conversion of biomass into biobased industrial products offers outstanding potential for benefit to the national interest through improved strategic security and balance of payments, healthier rural economies, improved environmental quality, near-zero net greenhouse gas emissions, technology export, and sustainable resource supply;

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

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

(4) biobased chemicals—

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

(B) have the clear potential for environmentally benign product life cycles;

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

(6) many biomass feedstocks suitable for industrial processing show the clear potential for sustainable production, in some cases resulting in improved soil fertility and carbon sequestration;

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

(B) technologies that result in further diversification of the range of value-added biobased industrial products can meet a key need for the grain processing industry;

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

(B) research resulting in cost-effective technology to overcome the recalcitrance of cellulosic biomass would allow biorefineries to produce fuels and

bulk chemicals on a very large scale, with a commensurately large realization of the benefit described in paragraph (1);

(9) research into the fundamentals to understand important mechanisms of biomass conversion can be expected to accelerate the application and advancement of biomass processing technology by—

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

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

(10) the added utility of biobased industrial products developed through improvements in processing technology would encourage the design of feedstocks that would meet future needs more effectively;

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

(12)(A) because of the relatively short-term time horizon characteristic of private sector investments, and because many benefits of biomass processing are in the national interest, it is appropriate

for the Federal Government to provide precommercial investment in fundamental research and research-driven innovation in the biomass processing area; and

(B) such an investment would provide a valuable complement to ongoing and past governmental support in the biomass processing area; and

(13) several prominent studies, including studies by the President's Council of Advisors on Science and Technology and the National Research Council—

(A) support the potential for large research-driven advances in technologies for production of biobased industrial products as well as associated benefits; and

(B) document the need for a focused, integrated, and innovation-driven research effort to provide the appropriate progress in a timely manner.

SEC. 103. DEFINITIONS.

In this title:

(1) ADVISORY COMMITTEE.—The term ''Advisory Committee'' means the Biomass Research and Development Technical Advisory Committee established by section 106.

(2) BIOBASED INDUSTRIAL PRODUCT.—The term ''biobased industrial product'' means fuels, commercial chemicals, building materials, or electric power or heat produced from biomass.

(3) BIOMASS.—The term ''biomass'' means any organic matter that is available on a renewable or recurring basis, including agricultural crops and trees, wood and wood wastes and residues, plants (including aquatic plants), grasses, residues, fibers, and animal wastes, municipal wastes and other waste materials.

(4) BOARD.—The term ''Board'' means the Biomass Research and Development Board established by section 105.

(5) INITIATIVE.—The term ''Initiative'' means the Biomass Research and Development Research Initiative established under section 107.

(6) INSTITUTION OF HIGHER EDUCATION.—The term ''institution of higher education'' has the meaning given that term in section 1201(a) of the Higher Education Act of 1965 (20 U.S.C. 1141(a)).

(7) NATIONAL LABORATORY.—The term ''national laboratory'' means a facility or group of facilities owned, leased, or operated by a Federal agency (including a contractor of the Federal agency) for

the performance of research, development, or engineering.

(8) POINT OF CONTACT.—The term ''point of contact'' means a point of contact designated under section 104(d).

(9) PROCESSING.—The term ''processing'' means the derivation of biobased industrial products from biomass, including—

(A) feedstock production;

(B) harvest and handling;

(C) pretreatment or thermochemical processing;

(D) fermentation;

(E) catalytic processing;

(F) product recovery; and

(G) coproduct production.

SEC. 104. COOPERATION AND COORDINATION IN BIOMASS RESEARCH AND DEVELOPMENT.

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

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

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

(2) develop new and cost-effective technologies that would result in large-scale commercial production of low cost and sustainable biobased industrial products;

(3) ensure that biobased industrial products are developed in a manner that enhances their economic, energy security, and environmental benefits; and

(4) promote the development and use of agricultural and energy crops for conversion into biobased industrial products.

(c) AREAS.—In carrying out this title, the Secretary of Agriculture and the Secretary of Energy, in consultation with heads of appropriate departments and agencies, shall promote research and development to—

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

(2) ensure full consideration of Federal land and land management programs as potential feedstock resources for biobased industrial products; and

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

(d) POINTS OF CONTACT.—

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

(A) the Secretary of Agriculture shall designate, as the point of contact for the Department of Agriculture, an officer of the Department of Agriculture appointed by the President to a position in the Department before the date of the designation, by and with the advice and consent of the Senate; and

(B) the Secretary of Energy shall designate, as the point of contact for the Department of Energy, an officer of the Department of Energy appointed by the President to a position in the Department before the date of the designation, by and with the advice and consent of the Senate.

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

(A) assist in arranging interlaboratory and site-specific supplemental agreements for research, development, and demonstration projects relating to biobased industrial products;

(B) serve as cochairpersons of the Board;

(C) administer the Initiative; and

(D) respond in writing to each recommendation of the Advisory Committee made under section 106.

SEC. 105. BIOMASS RESEARCH AND DEVELOPMENT BOARD.

(a) ESTABLISHMENT.—There is established the Biomass Research and Development Board to coordinate programs within and among departments and agencies of the Federal Government for the purpose of promoting the use of biobased industrial products by—

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

(2) bringing coherence to Federal strategic planning.

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

(1) The point of contact of the Department of Energy designated under section 104(d)(1)(B), who shall serve as cochairperson of the Board.

(2) The point of contact of the Department of Agriculture designated under section 104(d)(1)(A), who shall serve as cochairperson of the Board.

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

(A) The Department of the Interior.

(B) The Environmental Protection Agency.

(C) The National Science Foundation.

(D) The Office of Science and Technology Policy.

(4) At the option of the Secretary of Agriculture and the Secretary of Energy, other members appointed by the Secretaries (after consultation with members described in paragraphs (1) through (3)).

(c) DUTIES.—The Board shall—

(1) coordinate research, development, and demonstration activities relating to biobased industrial products—

(A) between the Department of Agriculture and the Department of Energy; and

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

(2) provide recommendations to the points of contact concerning administration of this title.

(d) FUNDING.—Each agency represented on the Board is encouraged to provide funds for any purpose under this title.

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

SEC. 106. BIOMASS RESEARCH AND DEVELOPMENT TECHNICAL ADVISORY COMMITTEE.

(a) ESTABLISHMENT.—There is established the Biomass Research and Development Technical Advisory Committee to—

(1) advise the Secretary of Energy, the Secretary of Agriculture and the points of contact concerning—

(A) the technical focus and direction of requests for proposals issued under the Initiative; and

(B) procedures for reviewing and evaluating the proposals;

(2) facilitate consultations and partnerships among Federal and State agencies, agricultural pro-

ducers, industry, consumers, the research community, and other interested groups to carry out program activities relating to the Initiative; and

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

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

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

(2) An individual affiliated with an institution of higher education who has expertise in biobased industrial products.

(3) two prominent engineers or scientists from government or academia who have expertise in biobased industrial products.

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

(5) An individual affiliated with an environmental or conservation organization.

(6) An individual associated with State government who has expertise in biobased industrial products.

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

(c) DUTIES.—The Advisory Committee shall—

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

(2) evaluate whether, and make recommendations in writing to the Board to ensure that—

(A) funds authorized for the Initiative are distributed and used in a manner that is consistent with the goals of the Initiative;

(B) the points of contact are funding proposals under this title that are selected on the basis of merit, as determined by an independent panel of scientific and technical peers; and

(C) activities under this title are carried out in accordance with this title.

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

SEC. 107. BIOMASS RESEARCH AND DEVELOPMENT INITIATIVE.

(a) IN GENERAL.—The Secretary of Agriculture and the Secretary of Energy, acting through their respective points of contact and in consultation with the Board, shall establish and carry out a Biomass Research and Development Initiative under which competitively-awarded grants, contracts, and financial assistance are provided to, or en-

tered into with, eligible entities to carry out research on biobased industrial products.

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

(1) stimulate collaborative activities by a diverse range of experts in all aspects of biomass processing for the purpose of conducting fundamental and innovation-targeted research and technology development;

(2) enhance creative and imaginative approaches toward biomass processing that will serve to develop the next generation of advanced technologies making possible low cost and sustainable biobased industrial products;

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

(4) promote integrated research partnerships among colleges, universities, national laboratories, Federal and State research agencies, and the private sector as the best means of overcoming technical challenges that span multiple research and engineering disciplines and of gaining better leverage from limited Federal research funds.

(c) ELIGIBLE ENTITIES.—

(1) IN GENERAL.—To be eligible for a grant, contract, or assistance under this section, an applicant shall be—

(A) an institution of higher education;

(B) a national laboratory;

(C) a Federal research agency;

(D) a State research agency;

(E) a private sector entity;

(F) a nonprofit organization; or

(G) a consortium of 2 or more entities described in subparagraphs (A) through (E).

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

(A) publish annually 1 or more joint requests for proposals for grants, contracts, and assistance under this section;

(B) establish a priority in grants, contracts, and assistance under this section for research that—

(i) demonstrates potential for significant advances in biomass processing;

(ii) demonstrates potential to substantially impact scale-sensitive national objec-

tives such as sustainable resource supply, reduced greenhouse gas emissions, healthier rural economies, and improved strategic security and trade balances; and

(iii) would improve knowledge of important biomass processing systems that demonstrate potential for commercial applications;

(C) require that grants, contracts, and assistance under this section be awarded competitively, on the basis of merit, after the establishment of procedures that provide for scientific peer review by an independent panel of scientific and technical peers; and

(D) give preference to applications that—

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

(ii) encourage the integration of disciplines and application of the best technical resources.

(d) USES OF GRANTS, CONTRACTS, AND ASSISTANCE.—A grant, contract, or assistance under this section may be used to conduct—

(1) research on process technology for overcoming the recalcitrance of biomass, including re-

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

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

(i) enhanced sugar yields;

(ii) lower overall chemical use;

(iii) less costly materials; and

(iv) cost reduction;

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

(C) approaches other than enzymatic hydrolysis for overcoming the recalcitrance of cellulosic biomass;

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

(A) metabolic engineering of biological systems (including the safe use of genetically modified crops) to produce novel products, especially commodity products, or to increase prod-

uct selectivity and tolerance, with a research priority on the development of biobased industrial products that can compete in performance and cost with fossil-based products;

(B) catalytic processing to convert intermediates of biomass processing into products of interest;

(C) separation technologies for cost-effective product recovery and purification;

(D) approaches other than metabolic engineering and catalytic conversion of intermediates of biomass processing;

(E) advanced biomass gasification technologies, including coproduction of power and heat as an integrated component of biomass processing, with the possibility of generating excess electricity for sale; and

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

(3) research aimed at ensuring the environmental performance and economic viability of biobased industrial products and their raw material input of biomass when considered as an integrated system, including research on—

(A) the analysis of, and strategies to enhance, the environmental performance and sustainability of biobased industrial products, including research on—

(i) accurate measurement and analysis of greenhouse gas emissions, carbon sequestration, and carbon cycling in relation to the life cycle of biobased industrial products and feedstocks with respect to other alternatives;

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

(iii) development and analysis of land management practices and alternative biomass cropping systems that ensure the environmental performance and sustainability of biomass production and harvesting;

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

(v) biomass gasification and combustion to produce electricity;

(B) the analysis of, and strategies to enhance, the economic viability of biobased industrial products, including research on—

(i) the cost of the required process technology;

(ii) the impact of coproducts, including food, animal feed, and fiber, on biobased industrial product price and large-scale economic viability; and

(iii) interactions between an emergent biomass refining industry and the petrochemical refining infrastructure; and

(C) the field and laboratory research related to feedstock production with the interrelated goals of enhancing the sustainability, increasing productivity, and decreasing the cost of biomass processing, including research on—

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

(ii) existing and new agricultural and energy crops that provide a sustainable resource for conversion to biobased industrial products while simultaneously serving as a source for coproducts such as food, animal feed, and fiber;

(iii) improved technologies for harvest, collection, transport, storage, and handling of crop and residue feedstocks; and

(iv) development of economically viable cropping systems that improve the conservation and restoration of marginal land; or

(4) Any research and development in technologies or processes determined by the Secretary of Agriculture and the Secretary of Energy, acting through their respective points of contact and in consultation with the Board, to be consistent with the purposes described in subsection (b) and priorities described in subsection (c)(2)(B).

(e) TECHNOLOGY AND INFORMATION TRANSFER TO AGRICULTURAL USERS.—

(1) IN GENERAL.—The Administrator of the Cooperative State Research, Education, and Extension Service and the Chief of the Natural Resources Conservation Service shall ensure that applicable research results and technologies from the Initiative are adapted, made available, and disseminated through their respective services, as appropriate.

(2) REPORT.—Not later than 5 years after the date of enactment of this title, the Administrator of

the Cooperative State Research, Education, and Extension Service and the Chief of the Natural Resources Conservation Service shall report to the committees of Congress with jurisdiction over the Initiative on the activities conducted by the services under this subsection.

(f) AUTHORIZATION OF APPROPRIATIONS.—In addition to funding provided for biomass research and development under the general authority of the Secretary of Energy to conduct research and development and demonstration programs (which may also be used to carry out this title), there are also authorized to be appropriated $49,000,000 to the Department of Agriculture for each of the fiscal years 2000 through 2005 to carry out this title.

SEC. 108. ADMINISTRATIVE SUPPORT AND FUNDS.

(a) IN GENERAL.—To the extent administrative support and funds are not provided by other agencies under subsection (b), the Secretary of Energy and the Secretary of Agriculture may provide such administrative support and funds of the Department of Energy and the Department of Agriculture to the Board and the Advisory Committee as are necessary to enable the Board and the Advisory Committee to carry out this title.

(b) OTHER AGENCIES.—The heads of the agencies referred to, or appointed under, paragraphs (3) and (4) of section 105(b) may, and are encouraged to, provide administrative support and funds of their respective agencies to the Board and the Advisory Committee.

SEC. 109. REPORTS.

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

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

(2) the general status of cooperation and research efforts carried out by each Secretary with respect to sustainable fuels, chemicals, and electricity derived from biomass, including a certification from the Board that the points of contact are funding proposals that are selected on the basis of merit, as determined by an independent panel of scientific and technical peers.

SEC. 110. SUNSET.

This title and the authority conferred by this title shall terminate on December 31, 2005.

TITLE II—AUTHORIZATION OF APPROPRIATIONS FOR ETHANOL RESEARCH PILOT PLANT.

SEC. 201. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated to construct a Department of Agriculture corn-based ethanol research pilot plant a total of $14,000,000 for fiscal year 2000 and subsequent fiscal years.

Passed the Senate February 29, 2000.

Attest:

Secretary.

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S 935 ES——2

S 935 ES——3

S 935 ES——4

S 935 ES——5