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REPORT
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WIND ENERGY RESEARCH AND DEVELOPMENT ACT OF 2009

SEPTEMBER 8, 2009.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. GORDON of Tennessee, from the Committee on Science and Technology, submitted the following

R E P O R T

[To accompany H.R. 3165]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science and Technology, to whom was referred the bill (H.R. 3165) to provide for a program of wind energy research, development, and demonstration, and for other purposes, having considered the same, report favorably thereon with an amendment and recommend that the bill as amended do pass.

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79–006

I. BILL

The amendment is as follows:

Strike all after the enacting clause and insert the following:

SECTION 1. SHORT TITLE.

This Act may be cited as the "Wind Energy Research and Development Act of 2009".

SEC. 2. WIND ENERGY RESEARCH AND DEVELOPMENT PROGRAM.

(a) IN GENERAL.—The Secretary of Energy shall carry out a program of research and development to—

(1) improve the energy efficiency, reliability, and capacity of wind turbines;

(2) optimize the design and adaptability of wind energy systems to the broadest practical range of atmospheric conditions; and

(3) reduce the cost of construction, generation, and maintenance of wind energy systems.

(b) PROGRAM.—The program under this section shall focus on research and development of—

(1) new materials and designs to make larger, lighter, less expensive, and more reliable rotor blades;

(2) technologies to improve gearbox performance and reliability;

(3) automation, materials, and assembly of large-scale components to reduce manufacturing costs;

(4) low-cost transportable towers greater than 100 meters in height to capitalize on improved wind conditions at higher elevations;

(5) advanced computational modeling tools to improve—

(A) the reliability of aeroelastic simulations of wind energy systems;

(B) understanding of the interaction between each wind turbine component;

(C) siting of wind energy systems to maximize efficiency and minimize variable generation;

(D) integration of wind energy systems into the existing electric grid to ensure reliability; and

(E) understanding of the wake effect between upwind and downwind turbine operations;

(6) advanced control systems and blade sensors to improve performance and reliability under a wide variety of wind conditions;

(7) advanced generators, including—

(A) medium-speed and low-speed generators;

(B) direct-drive technology; and

(C) the use of advanced magnets in generator rotors;

(8) wind technology for offshore applications;

(9) methods to assess and mitigate the effects of wind energy systems on radar and electromagnetic fields;

(10) wind turbines with a maximum electric power production capacity of 100 kilowatts or less;

(11) technical processes to enable—

(A) scalability of transmission from remotely located renewable resource rich areas; and

(B) optimization of advanced infrastructure design, including high voltage transmission; and

(12) other research areas as determined by the Secretary.

SEC. 3. WIND ENERGY DEMONSTRATION PROGRAM.

(a) IN GENERAL.—The Secretary of Energy shall conduct a wind energy demonstration program. In carrying out this section, the Secretary shall ensure that—

(1) the program is of sufficient size and geographic diversity to measure wind energy system performance under the full productive range of wind conditions in the United States;

(2) demonstration projects carried out under this program are—

(A) conducted in collaboration with industry and, as appropriate, with academic institutions; and

(B) located in various geographic areas representing various wind class regimes; and

(3) data collected from demonstration projects carried out under this program is useful for carrying out section 2(b).

(b) COST-SHARING.—The Secretary shall carry out the program under this section in compliance with section 988(a) through (d) and section 989 of the Energy Policy Act of 2005 (42 U.S.C. 16352(a) through (d) and 16353).

SEC. 4. EQUAL OPPORTUNITY.

In carrying out this Act, the Secretary of Energy shall—

(1) coordinate with the Office of Minority Economic Impact and with the Office of Small and Disadvantaged Business Utilization; and

(2) provide special consideration to applications submitted by institutions, businesses, or entities containing majority representation by individuals identified in section 33 or 34 of the Science and Engineering Equal Opportunities Act (42 U.S.C. 1885a or 1885b).

SEC. 5. COMPETITIVE AWARDS.

Awards under section 2 and section 3 shall be made on a competitive basis with an emphasis on technical merit.

SEC. 6. COORDINATION AND NONDUPLICATION.

To the maximum extent practicable the Secretary of Energy shall coordinate activities under this Act with other programs of the Department of Energy and other Federal research programs.

SEC. 7. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated to the Secretary of Energy to carry out this Act $200,000,000 for each of the fiscal years 2010 through 2014.

II. PURPOSE

The purpose of H.R. 3165, sponsored by Representative Paul Tonko, is to authorize a comprehensive research, development, and demonstration program to advance wind energy technologies.

III. BACKGROUND AND NEED FOR THE LEGISLATION

According to a Department of Energy (DOE) report published in May 2008 entitled 20% Wind Energy by 2030, a much greater proportion of the nation's demand for electrical energy could be provided by exploiting our land-based and offshore wind resources. Factoring in environmental and other relevant land use exclusions, Pacific Northwest National Laboratory determined that the top 12 states in wind energy potential could theoretically produce more than double the U.S.'s current annual generation of electricity. In order of their theoretical potential, these states are: North Dakota, Texas, Kansas, South Dakota, Montana, Nebraska, Wyoming, Oklahoma, Minnesota, Iowa, Colorado, and New Mexico.

However, to expand from today's proportion of electric generation from wind (less than 2 percent) to a scenario where the U.S. generates 20 percent or more of its power from wind energy requires several significant advances including: improved wind turbine technology, improved wind forecasting capability, improved energy storage, and expansion of transmission systems to deliver wind power from resource centers to centers of population. In turn, these changes in the power generation and delivery process may involve changes in manufacturing, policy development, and environmental regulation.

Overall performance of wind energy systems can be substantially improved to become more efficient, cost-effective, and reliable. Fundamental technical issues remain even while wind power is competitive with coal and other conventional forms of energy in some markets. As a follow-up to DOE's wind energy report, the American Wind Energy Association (AWEA) Research and Development Committee produced a detailed Action Plan to 20% Wind Energy by

2030 in March 2009. This plan proposed $217 million in annual federal funding combined with a $224 million industry/state cost share to support specific research and development programs which the AWEA Committee believes are necessary to meet a goal of providing 20 percent of America's electricity from wind by 2030.

This would be a significant increase from the DOE wind program's current annual budget of roughly $50 million, notwithstanding the one-time expenditure of $118 million currently identified by the Department for additional wind research and development activities from the American Recovery and Reinvestment Act of 2009. In recent years much of the federal wind program has focused on testing and evaluation of commercial turbines rather than advanced research, leading to gaps in our national wind R&D portfolio. There is broad consensus among government, academic, and industry leaders that research areas in which greater federal support could have a considerable impact include:

- new materials and designs to make larger, lighter, less expensive, and more reliable rotor blades;
- advanced generators to improve the efficiency of converting blade rotation to electric power;
- automation, production materials, and assembly of large-scale components to reduce manufacturing costs;
- low-cost transportable towers greater than 100 meters in height to capitalize on improved wind conditions at higher elevations;
- advanced computational tools to improve the reliability of aeroelastic simulations of wind energy systems; and
- advanced control systems and blade sensors to improve performance and reliability under a wide variety of wind conditions.

H.R. 3165 authorizes research targeted to fulfill these areas of needed research. Providing federal support to address areas of common need for the wind industry will help us to reach the goal of increasing the proportion of electrical generation from wind resources.

IV. Hearing Summary

The Energy and Environment Subcommittee held a hearing in the 111th Congress on July 14, 2009 to receive testimony on H.R. 3165, the Wind Energy Research and Development Act of 2009, as well as solar research activities supported by the Department of Energy. Witnesses included:

Mr. Steve Lockard, CEO of TPI Composites and co-chair of the American Wind Energy Association (AWEA) Research & Development Committee.

Mr. John Saintcross, Energy and Environmental Markets Program Manager, New York State Energy Research and Development Authority.

Prof. Andrew Swift, Director of the Wind Science and Engineering Research Center at Texas Tech University.

Mr. Ken Zweibel, Director of the George Washington University Solar Institute.

Ms. Nancy Bacon, Senior Advisor for United Solar Ovonic and Energy Conversion Devices, Inc.

The hearing examined research, development, and demonstration needs for wind energy technologies from the perspective of the wind industry, government, and academic institutions.

Mr. Lockard stated that both AWEA and his company endorse H.R. 3165 and urge Members to support its passage. He noted that the bill was consistent with the findings of the Action Plan to 20% Wind Energy by 2030 produced in March 2009 by the AWEA Research & Development Committee he co-chairs.

Mr. Saintcross explained that in his experience, wind energy systems still need to overcome several technical challenges as they attempt to meet a significant portion of New York State's renewable portfolio standard. He noted that the output from today's large wind turbines have consistently lagged announced expectations from their suppliers, and that improvements are needed in turbine gearbox efficiency, fabrication techniques, and diagnostic tools among other areas. Mr. Saintcross also stated that NYSERDA's research activities "could benefit greatly from co-funding from an increased federal wind technology budget as proposed in the legislation 'Wind Energy Research and Development Act of 2009' being considered by the Committee."

Prof. Swift discussed ways that universities can work with national laboratories and the wind industry to advance wind energy system performance. He also described the wind industry's ongoing workforce development needs as well as technical issues including rotor design and control systems, advanced materials, and current gaps in the U.S.'s wind energy forecasting capabilities.

V. Committee Actions

The Subcommittee on Energy and Environment met to consider H.R. 3165, the Wind Energy Research and Development Act of 2009, on July 21, 2009.

Mr. Inglis offered an amendment to amend the list of areas to be focused on under the research and development program to include other research areas as determined by the Secretary. The amendment was agreed to by voice vote.

Mr. Luján offered an amendment to add advanced computational modeling tools to improve siting of wind energy systems to maximize efficiency and minimize variable generation and to improve integration of wind energy systems into the existing electric grid to ensure reliability as areas to be focused on under the research and development program. The amendment was agreed to by voice vote.

Mr. Baird moved that the Subcommittee favorably report H.R. 3165, as amended, to the Full Committee. The motion was agreed to by voice vote.

The Committee on Science and Technology met to consider H.R. 3165 on July 29, 2009.

Mr. Neugebauer offered an amendment to ensure geographic diversity in wind energy demonstration projects and to add advanced computational modeling tools to improve understanding of the wake effect between upwind and downwind turbine operations as an area of research and development to be focused on under the research and development program. The amendment was agreed to by voice vote.

Mr. Smith of Nebraska offered an amendment to add scalability of transmission from remotely located renewable resource rich

areas and optimization of advanced infrastructure design to the areas of research and development to be focused on under the research and development program. The amendment was agreed to by voice vote.

Ms. Johnson of Texas offered an amendment to require the Secretary of Energy to coordinate with the Office of Minority Economic Impact and with the Office of Small and Disadvantaged Business Utilizations, and to provide special consideration to applications submitted by institutions, businesses, or entities containing majority representation by individuals identified in the Science and Engineering Equal Opportunities Act. The amendment was agreed to by voice vote.

Mr. Bartlett offered an amendment to ensure that all awards are made on a competitive basis with an emphasis on technical merit. The amendment was agreed to by voice vote.

Mr. McCaul offered an amendment instructing the Department of Energy to coordinate activities under this Act with other Federal research programs, to the maximum extent practicable. The amendment was agreed to by voice vote.

Mr. Gordon moved that the Committee favorably report the bill, H.R. 3165, as amended, to the House. The motion was agreed to by a voice vote.

VI. Summary of Major Provisions of the Bill

H.R. 3165 requires the Secretary of Energy to carry out a program of research and development to: improve the energy efficiency, reliability, and capacity of wind turbines; optimize the design and adaptability of wind energy systems; and reduce the cost of construction, generation, and maintenance of wind energy systems.

Specifically, the bill authorizes a program to focus on research and development of: (1) new materials and designs to make larger, lighter, less expensive, and more reliable motor blades; (2) technologies to improve gearbox performance and reliability; (3) automation, materials, and assembly of large-scale components; (4) low-cost transportable towers greater than 100 meters in height; (5) advanced computational modeling tools; (6) advanced control systems and blade sensors; (7) advanced generators; (8) wind technology for offshore applications; (9) methods to assess and mitigate the effects of wind energy systems on radar and electromagnetic fields; (10) wind turbines with a maximum electric power production capacity of 100 kilowatts or less; (11) technical processes to enable scalability of transmission from remotely located renewable resource rich areas and optimization of advanced infrastructure design; and (12) other research areas as determined by the Secretary.

H.R. 3165 also requires the Secretary of Energy to conduct a wind energy demonstration program. Under the bill, the Secretary is required to ensure that the program is of sufficient size and geographic diversity to measure wind energy performance under the full productive range of wind conditions in the United States and that data collected from demonstration projects is useful for carrying out the research and development program. The Secretary is also required to ensure that demonstration projects carried out under the program are conducted in collaboration with industry.

The bill authorizes $200 million for each of fiscal years 2010 through 2014 for these activities.

VII. Section-by-Section Analysis

Sec. 1. Short title

Section 1 states that this Act may be cited as the "Wind Energy Research and Development Act of 2009".

Sec. 2. Wind energy research and development program

Section 2(a) establishes the overall goals of the Department of Energy's wind energy research and development program.

Section 2(b) identifies focus areas for this program, including: new materials and designs to make larger, lighter, less expensive, and more reliable rotor blades; advanced generators to improve the efficiency of converting blade rotation to electric power; advanced computational modeling tools; and innovative control systems and blade sensors to improve performance and reliability under a wide variety of wind conditions. It also authorizes the Secretary to pursue other promising wind energy research areas not explicitly identified in this section.

Sec. 3. Wind energy demonstration program

Section 3 instructs the Secretary to carry out a significant wind energy demonstration program in collaboration with industry following enacted cost-sharing law.

Sec. 4. Equal opportunity

Section 4 instructs the Secretary to provide special consideration to applications submitted by institutions, businesses, or entities containing majority representation by individuals identified in the Science and Engineering Equal Opportunities Act.

Sec. 5. Competitive awards

Section 5 states that all awards shall be made on a competitive basis with an emphasis on technical merit.

Sec. 6. Coordination and nonduplication

Section 6 instructs the Secretary to coordinate activities under this Act with other Federal research programs to the maximum extent practicable.

Sec. 7. Authorization of appropriations

Section 7 authorizes to be appropriated to the Secretary of Energy to carry out this Act $200,000,000 for each of the fiscal years 2010 through 2014.

VIII. Committee Views

The Committee notes that while wind power has emerged as the fastest growing renewable energy source in the country over the last several years, there are still many significant technical issues that need to be addressed before wind can serve as a large provider of baseload electricity in the United States. Several of these issues, such as the consistent underperformance of megawatt-scale turbines, have become more evident precisely because of the industry's

recent growth. The Committee finds that the Department of Energy's current ongoing wind energy program, while providing strong on-site testing and evaluation services at the National Renewable Energy Laboratory, does not provide adequate resources or attention to address wind technologies' long-term, cross-cutting research needs. The Committee also finds that a larger, more geographically diverse demonstration program is required to advance these technologies and improve their cost-competitiveness with fossil fuel-based energy sources as quickly as possible.

The Committee believes that this bill represents a broad consensus of industry, academic, and government experts on today's wind energy research, development, and demonstration needs. H.R. 3165 is formally endorsed by the American Wind Energy Association and the House of Representatives Sustainable Energy and Environment Coalition. The Committee also believes that setting this robust, widely-vetted authorization level should be an important guide to future budget requests from the Administration, noting that no authorization level has been set in law for wind research and development since the Department of Energy's immediate predecessor, the Energy Research and Development Administration (ERDA), was established in 1975.

In examining options to improve transmission from remotely located resource-rich areas, the Committee believes that the Department of Energy must fully explore and advance below-ground technologies, including high temperature superconductors and high voltage direct current cables.

The Committee notes that the Great Lakes, as well as other offshore locations throughout the United States, have significant wind energy potential. According to the U.S. Department of Energy's National Renewable Energy Laboratory wind classifications, the Great Lakes have wind power classification ratings ranging from Excellent to Outstanding. Lake Erie presents unique opportunities for offshore wind technologies given it is the shallowest of the Great Lakes and is surrounded by major population centers and favorable electricity transmission interconnection points.

IX. Cost Estimate

A cost estimate and comparison prepared by the Director of the Congressional Budget Office under section 402 of the Congressional Budget Act of 1974 has been timely submitted to the Committee on Science and Technology prior to the filing of this report and is included in Section X of this report pursuant to House Rule XIII, clause 3(c)(3).

H.R. 3165 does not contain new budget authority, credit authority, or changes in revenues or tax expenditures. H.R. 3165 does authorize additional discretionary spending, as described in the Congressional Budget Office report on the bill, which is contained in Section X of this report.

X. CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

AUGUST 19, 2009.

Hon. BART GORDON,
Chairman, Committee on Science and Technology,
House of Representatives, Washington, DC.

DEAR MR. CHAIRMAN: The Congressional Budget Office has prepared the enclosed cost estimate for H.R. 3165, the Wind Energy Research and Development Act of 2009.

If you wish further details on this estimate, we will be pleased to provide them. The CBO staff contact is Jeff LaFave.

Sincerely,

DOUGLAS W. ELMENDORF.

Enclosure.

H.R. 3165—Wind Energy Research and Development Act of 2009

Summary: H.R. 3165 would authorize the appropriation of $1 billion over the 2010–2014 period for a Department of Energy (DOE) research and development program to improve wind energy technologies. Assuming appropriation of the authorized amounts, CBO estimates that implementing the legislation would cost $880 million over the 2010–2014 period and $120 million after 2014. Enacting the legislation would not affect direct spending or revenues.

H.R. 3165 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act (UMRA) and would impose no costs on state, local, or tribal governments.

Estimated cost to the Federal Government: The estimated budgetary impact of H.R. 3165 is shown in the following table. The costs of this legislation fall within budget function 250 (general science, space, and technology).

	By fiscal year, in millions of dollars—					
	2010	2011	2012	2013	2014	2010–2014
CHANGES IN SPENDING SUBJECT TO APPROPRIATION						
Authorization Level	200	200	200	200	200	1,000
Estimated Outlays	110	170	200	200	200	880

Basis of estimate: For this estimate, CBO assumes the bill will be enacted near the end of fiscal year 2009 and that the authorized amounts will be appropriated each year. Estimated outlays are based on historical spending patterns for DOE research programs.

H.R. 3165 would authorize the appropriation of $200 million a year over the 2010–2014 period for research, development, and demonstration activities related to wind energy systems. Specifically, the bill would direct DOE to establish a research and development program to improve the efficiency of wind turbines, reduce the cost of wind energy systems, and conduct a demonstration program to measure the performance of wind energy systems at locations across the United States.

Intergovernmental and private-sector impact: H.R. 3165 contains no intergovernmental or private-sector mandates as defined in

UMRA and would impose no costs on state, local, or tribal governments.

Estimate prepared by: Federal Costs: Jeff LaFave; Impact on State, Local, and Tribal Governments: Ryan Miller; Impact on the Private Sector: Amy Petz.

Estimate approved by: Theresa Gullo, Deputy Assistant Director for Budget Analysis.

XI. Compliance With Public Law 104–4

H.R. 3165 contains no unfunded mandates.

XII. Committee Oversight Findings and Recommendations

The oversight findings and recommendations of the Committee on Science and Technology are reflected in the body of this report.

XIII. Statement on General Performance Goals and Objectives

Pursuant to clause 3(c) of House Rule XIII, the goal of H.R. 3165 is to authorize a comprehensive research, development, and demonstration program to advance wind energy technologies.

XIV. Constitutional Authority Statement

Article I, section 8 of the Constitution of the United States grants Congress the authority to enact H.R. 3165.

XV. Federal Advisory Committee Statement

H.R. 3165 does not establish nor authorize the establishment of any advisory committee.

XVI. Congressional Accountability Act

The Committee finds that H.R. 3165 does not relate to the terms and conditions of employment or access to public services or accommodations within the meaning of section 102(b)(3) of the Congressional Accountability Act (Public Law 104–1).

XVII. Earmark Identification

H.R. 3165 does not contain any congressional earmarks, limited tax benefits, or limited tariff benefits as defined in clause 9(d), 9(e), or 9(f) of rule XXI.

XVIII. Statement on Preemption of State, Local, or Tribal Law

This bill is not intended to preempt any state, local, or tribal law.

XIX. Committee Recommendations

On July 29, 2009, the Committee on Science and Technology by voice vote favorably reported the bill, H.R. 3165, as amended, to the House with the recommendation that the bill, as amended, do pass.

XX: PROCEEDINGS OF THE MARKUP BY THE SUBCOMMITTEE ON ENERGY AND ENVIRONMENT ON H.R. 3165, THE WIND ENERGY RESEARCH AND DEVELOPMENT ACT OF 2009

TUESDAY, JULY 21, 2009

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT,
COMMITTEE ON SCIENCE,
Washington, DC.

The Subcommittee met, pursuant to call, at 2:03 p.m., in Room 2318 of the Rayburn House Office Building, Hon. Brian Baird [Chair of the Subcommittee] presiding.

Chair BAIRD. The Subcommittee will now come to order. Pursuant to notice the Subcommittee on Energy and Environment meets to consider the following measures: H.R. 3246, the *Advanced Vehicle Technology Act of 2009,* H.R. 3165, the *Wind Energy Research and Development Act of 2009,* H.R. 3029, *To establish a research, development, and technology demonstration program to improve the efficiency of gas turbines used in combined cycle power generation systems,* and H.R. 3247, *To establish a social and behavioral sciences research program at the Department of Energy, and for other purposes.*

As I just mentioned, this afternoon our committee is considering those four bills. I will go into a bit more detail now.

H.R. 3246 is authored by Representative Peters and co-sponsored by Representative Biggert of our subcommittee. This legislation authorizes research and development on different classes of vehicles with the goal of reducing or eliminating petroleum fuel use and their associated emissions.

H.R. 3165, the *Wind Energy Research and Development Act of 2009,* is offered by our colleague, Mr. Tonko. This legislation authorizes several areas of research identified in a recent report outlining the needs for expanding the use of wind-powered electricity generation.

H.R. 3029 is also offered by the now prolific Mr. Tonko. This bill establishes an R&D program to improve the efficiency of gas turbines used in combined cycle power generation systems. Today 15 percent of electric power is produced from natural gas. This percentage is predicted to double over the next decade. The investment cost for new power plants are very high, and once built they operate for many decades. It is vital we build them to be as efficient as possible from the outset, and this legislation will help achieve that goal.

Finally, we will mark up H.R. 3247, a bill I introduced to authorize a social and behavioral research program at the Department of Energy. Technology development and investment are only part of the solution to our energy problem. The decisions each of us make every day have a significant impact on energy production and consumption. It is important that we understand why some technologies are more readily embraced than others, and it is impor-

tant that we know how to communicate effectively about the nature of our energy challenge and know how to empower individual citizens to participate in overcoming those challenges.

The four bills we will consider today address important energy technology needs and the need for more research on the human factors that determine their acceptance and success. I look forward to a productive markup. Thank you all for your attendance and participation this afternoon.

I now recognize Mr. Inglis to present opening remarks.

[The prepared statement of Chair Baird follows:]

PREPARED STATEMENT OF CHAIR BRIAN BAIRD

This afternoon the Subcommittee will consider four bills.

H.R. 3246, the *Advanced Vehicle Technology Act of 2009* is authored by Rep. Peters and co-sponsored by Rep. Biggert of our subcommittee. This legislation authorizes research and development on different classes of vehicles with a goal of reducing or eliminating petroleum fuel use and their associated emissions.

H.R. 3165, the *Wind Energy Research and Development Act of 2009* is authored by our colleague, Mr. Tonko. This legislation authorizes several areas of research identified in a recent report outlining the needs for expanding the use of wind powered electricity generation.

H.R. 3029, is also authored by Rep. Tonko. This bill establishes an R&D program to improve the efficiency of gas turbines used in combined cycle power generation systems. Today, 15 percent of our electric power is produced from natural gas. This percentage is predicted to double over the next decade. The investment costs for new power plants are very high and, once built they operate for many decades. It is vital that we build them to be as efficient as possible from the outset.

Finally, we will be marking up H.R. 3247. I introduced H.R. 3247 last week to authorize a social and behavioral research program at the Department of Energy. Technology development and investment are only part of the solution to our energy problem. The decisions each of us make every day have a significant impact on energy production and consumption. It is important that we understand why some technologies are more readily embraced than others. And it is important that we know how to communicate effectively about the nature of our energy challenges and know how to empower individual citizens to participate in overcoming them.

The four bills we will consider today address important energy technology needs and the need for more research on the human factors that determine their acceptance and success.

I look forward to a productive markup. Thank you all for your attendance and participation this afternoon.

Mr. INGLIS. Thank you, Mr. Chairman, and I am looking forward to discussing and improving the four pieces of legislation before us today.

The *Advanced Vehicle Technology Act of 2009* will authorize a vehicle technologies program at DOE. The bill realigns the program to approach a wide variety of critical transportation and technology research areas, with the goal of reducing petroleum use and the related emissions.

A balanced and robust research program is necessary to expand our mobility options, increase our national security, and establish the United States as a world leader in auto and truck design, manufacture, and transportation fuel development.

The second bill we will discuss today is the *Wind Energy Research and Development Act.* As the Department of Energy and the American Wind Energy Association have made clear, expanding our wind-power generating capacity will require a significant improvement in turbine technologies, forecasting capabilities, energy storage, and the transmission grid.

Strengthening the research effort in wind energy will help us move away from polluting fossil fuel energy, while creating jobs in wind energy design, manufacturing, and operation.

H.R. 3029 will implement a short-term research, development, and demonstration project at DOE to push gas turbine combine cycle generation systems to 65 percent efficiency. Natural gas is a clean-burning fuel produced right here in the United States and is the fastest growing source of new electricity capacity. Increasing turbine efficiency will reduce fuel usage and corresponding emissions, optimize our use of this limited resource, and lower electricity costs.

Finally, H.R. 3247 establishes a social and behavioral sciences research program at the Department of Energy. This research is intended to help us better understand the way individual decisions impact energy markets and energy technology development.

I am aware of the National Science Foundation's work in this area. I understand the Chairman's desire to see this work become an emphasis of DOE. I look forward to hearing how that cross-pollenization may work, and I will have some questions about how it would work.

Thank you again for the opportunity to work with you on this legislation, Mr. Chairman.

[The prepared statement of Mr. Inglis follows:]

PREPARED STATEMENT OF REPRESENTATIVE BOB INGLIS

Good morning and thank you for holding this markup, Mr. Chairman. I'm looking forward to discussing and improving the four pieces of legislation before us today.

The *Advanced Vehicle Technology Act of 2009* will reauthorize the Vehicle Technologies Program at DOE. The bill realigns the program to approach a wide variety of critical transportation technology research areas with the goal of reducing petroleum use and the related emissions. A balanced and robust research program is necessary to expand our mobility options, increase our national security, and establish the United States as a world leader in auto and truck design and manufacturing and transportation fuel development.

The second bill we'll address today, is the *Wind Energy Research and Development Act*. As the Department of Energy and the American Wind Energy Association have made clear, expanding our wind power generating capacity will require significant improvement in turbine technologies, forecasting capabilities, energy storage, and the transmission grid. Strengthening the research effort in wind energy will help us move away from polluting fossil fuel energy while creating jobs in wind energy design, manufacturing, and operation.

H.R. 3029 will implement a short-term research, development, and demonstration program at DOE to push gas turbine combined cycle generating systems to 65 percent efficiency. Natural gas is a clean burning fuel produced right here in the United States and is the fastest growing source of new electricity capacity. Increasing turbine efficiency will reduce fuel usage and corresponding emissions, optimize our use of this limited resource, and lower electricity costs.

Finally, H.R. 3247 establishes a social and behavioral sciences research program at the Department of Energy. This research is intended to help us better understand the way individual decisions impact energy markets and energy technology development. I'm aware of the National Science Foundation's work in this area, and I understand the Chairman's desire to see this work become an emphasis at the DOE. I look forward to hearing how that cross-pollination might work.

Thank you again for the opportunity to work with you on this legislation, Mr. Chairman.

Chair BAIRD. Thank you, Mr. Inglis. Members may place statements in the record at this point.

We will now consider H.R. 3165, the *Wind Energy Research and Development Act of 2009*. I understand Mr. Tonko is involved in another mark of the legislation. I have described it earlier. We have had hearings on this topic, and I would urge its passage, and I am

certain Mr. Tonko will speak to this when it comes to the Full Committee.

I would now recognize Mr. Inglis if he has additional remarks on the bill.

Mr. INGLIS. Thank you, Mr. Chairman.

In the upstate of South Carolina, General Electric employs about 1,500 engineers and 1,500 production employees dedicated to designing and manufacturing advanced wind and gas turbines. These are great-paying jobs, stable jobs that benefit our local economy. An expansion of wind energy capacity will not only create more great jobs like these at General Electric in Greenville but will make the U.S. a world leader in the wind energy sector.

DOE and the American Wind Energy Association agree that there are no prohibitive obstacles to rapidly expanding our wind energy capacity to 20 percent by 2030. In that we have a lot to gain economically and environmentally from increasing our dependence on this energy source.

This bill addresses specific research challenges to building a domestic fleet of efficient and reliable wind turbines and meeting the 20 percent by 2030 goal.

So I am happy to support the bill, Mr. Chairman, and I yield back.

[The prepared statement of Mr. Inglis follows:]

PREPARED STATEMENT OF REPRESENTATIVE BOB INGLIS

In the Upstate, General Electric employs about 1,500 engineers and 1,500 production employees dedicated to designing and manufacturing advanced wind and gas turbines. These are high paying, stable jobs benefiting the local economy. An expansion of wind energy capacity will not only create more great jobs like those at GE in Greenville, but will make the U.S. a world leader in the wind energy sector. DOE and the American Wind Energy Association agree that there are no prohibitive obstacles to rapidly expanding our wind energy capacity to 20 percent by 2030, and that we have a lot to gain economically and environmentally from increasing our dependence on this energy source. This bill addresses specific research challenges to building a domestic fleet of efficient and reliable wind turbines and meeting the 20 percent by 2030 goal.

[The prepared statement of Mr. Tonko follows:]

PREPARED STATEMENT OF REPRESENTATIVE PAUL D. TONKO

Thank you Mr. Chairman.

Mr. Chairman, my bill is H.R. 3165, the *Wind Energy Research and Development Act of 2009.* The Department of Energy (DOE) published a report that examines the technical feasibility of using wind energy to generate 20 percent of the Nation's electricity demand by 2030. The report, *"20% Wind Energy by 2030: Increasing Wind Energy's Contribution to U.S. Electricity Supply,"* includes contributions from DOE and its national laboratories, the wind industry, electric utilities, and other groups. The report examines the costs, major impacts, and challenges associated with producing 20 percent wind energy or 300 GW of wind generating capacity by 2030.

In response to the DOE report, the American Wind Energy Association published a report indicating that in order to reach the 20 percent goal by 2030 our nation must provide more funding for wind energy research and development and other wind-related programs. The DOE Wind Program currently receives about $50 million annually, a level that is well below the record $63 million appropriated in FY 1980. In comparison, the research and development budget for nuclear energy is over $960 million, coal receives at least $500 million, solar receives $168 million, and biomass receives roughly $200 million.

A team of over 80 American Wind Energy Association (AWEA) members and advisors from industry, government, and academic institutions have identified $217 million in federal funding, combined with a $224 million industry/State cost share, that will be necessary to support the research and development and related programs

needed to meet the goal of providing 20 percent of America's electricity from wind by 2030.

Therefore, my bill, the *Wind Energy Research and Development Act of 2009,* which is endorsed by AWEA, will give the Secretary of Energy the authority to implement a program of research and development to improve the efficiency, reliability and capacity of wind turbines as well as optimize the design and adaptability of wind systems. Ultimately, this will reduce the cost of construction, generation and maintenance of systems.

The program will focus on research and development of making materials larger, lighter, more reliable and more affordable. It will also work towards improving gearbox reliability and performance, reducing manufacturing costs, and advance computational modeling tools, among other things.

The bill provides $200 million a year for fiscal years 2010 through 2014, an amount that is directly in line with the DOE and AWEA reports, and will help ensure a diversity of players in the wind R&D market.

I know that my colleagues Mr. Inglis and Mr. Luján have amendments on this bill of which I am supportive. Thank you for your input on the bill.

Mr. Chairman, I yield back the balance of my time.

Chair BAIRD. Does anyone else wish to be recognized?

I would ask unanimous consent that the bill is considered as read and open to amendment at any point, that the Members proceed with the amendments in the order of the roster. Without objection, so ordered.

The first amendment on the roster is an amendment offered by the Ranking Member, Mr. Inglis. Are you ready to proceed with your amendment, Mr. Inglis?

Mr. INGLIS. Yes, Mr. Chairman. I have an amendment at the desk.

Chair BAIRD. The Clerk will report the amendment.

The CLERK. Amendment to H.R. 3165, amendment number 001, offered by Mr. Inglis of South Carolina.

Chair BAIRD. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentleman for five minutes to explain his amendment.

Mr. INGLIS. Mr. Chairman, my amendment is fairly simple and self-explanatory. It follows the—it allows the Secretary of Energy to include other research and development focus areas in the Wind Energy Research and Development Program listed on pages 2 and 3 of the bill.

The American Wind Energy Association's action plan to achieve 20 percent wind energy by 2030, listed 59 action items, "deemed necessary to meet the 20 percent wind vision by 2030."

My amendment allows for the Secretary to determine which additional areas, if any, to focus R&D in order to achieve the 20 percent by 2030, goal.

And I would urge adoption of the amendment, Mr. Chairman.

[The prepared statement of Mr. Inglis follows:]

PREPARED STATEMENT OF REPRESENTATIVE BOB INGLIS

Mr. Chairman, my amendment is pretty simple and self-explanatory. It allows the Secretary of Energy to include other research and development focus areas in the wind energy research and development program listed on pages 2 and 3 of the bill. The American Wind Energy Association's Action Plan to Achieve 20 percent Wind Energy by 2030 listed 59 action items "deemed necessary to meet the 20 percent wind vision by 2030." My amendment allows for the Secretary to determine which additional areas, if any, to focus R&D on in order to achieve the 20 percent by 2030 goal.

Chair BAIRD. This strikes me as a constructive and useful amendment. I applaud the gentleman for offering it and would urge support.

Is there further discussion on the amendment?

If no, the vote occurs on the amendment. All in favor will say aye. Those opposed, no. The ayes have it. The amendment is agreed to.

The second amendment on the roster is an amendment offered by the gentleman from New Mexico, Mr. Luján. Are you ready to proceed with your amendment?

Mr. LUJÁN. Yes, Mr. Chairman. I have an amendment at the desk.

Chair BAIRD. The Clerk will report the amendment.

The CLERK. Amendment to H.R. 3165, amendment number 026, offered by Mr. Luján of New Mexico.

Chair BAIRD. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentleman from New Mexico for five minutes to explain his amendment.

Mr. LUJÁN. Thank you very much, Mr. Chairman.

New Mexico is well-positioned to be a leader in renewable energy development, and wind and solar have the potential to solve our energy problems. New Mexico has vast energy resources in wind and solar. Already scientists and entrepreneurs are hard at work harnessing the power of the wind in Eastern New Mexico, and the eastern side of my state has become an immense generating source of wind energy.

In my District the North American Wind Research and Training Center and Mesalands Community College has established curricula and provided training opportunities to create a strong labor force to support a robust renewable energy economy.

Still we have a lot of work to do, and I commend Congressman Tonko for introducing this important legislation that invests in wind energy research, development, and demonstration. H.R. 3165 establishes a program that focuses on the research and development of advanced computational modeling tools to improve the study of wind energy systems.

My amendment today adds two new subparagraphs under the computational modeling research and development section. The first subparagraph focuses on using computational modeling tools to assist in locating ideal sites on which to build wind energy systems. Advanced computational resources can help developers make better informed decisions to maximize wind energy production and efficiency while minimizing variable generation.

The intermittent nature of wind power needs to be addressed. My amendment addresses this by adding an additional subparagraph that focuses on using computational modeling tools to improve the integration of wind energy systems into the electric grid. Investing in technology that focuses on integration of renewable energy into the grid ensures power reliability and brings us closer to achieving a clean energy economy.

Thank you, Mr. Chairman. I yield back my time.

[The prepared statement of Mr. Luján follows:]

PREPARED STATEMENT OF REPRESENTATIVE BEN R. LUJÁN

Thank you Mr. Chairman.

New Mexico is well-positioned to be a leader in renewable energy development and wind and solar have the potential to power our entire country. New Mexico has vast energy resources in wind and solar. Already, scientists and entrepreneurs are hard at work harnessing the power of the wind in Eastern New Mexico and the eastern side of our state has become a generating source of renewable wind energy. In my District, the North American Wind Research and Training Center at Mesalands Community College has established curriculum and provided training opportunities to create a strong labor force to support a robust renewable energy economy. Still, we have a lot of work to do, and I commend Congressman Tonko for introducing this important legislation that invests in wind energy research, development and demonstration.

H.R. 3165 establishes a program that focuses on the research and development of advanced computational modeling tools to improve the study of wind energy systems. My amendment today adds two new subparagraphs under the computational modeling research and development section.

The first subparagraph focuses on using computational modeling tools to assist in locating ideal sites on which to build wind energy systems. Advanced computational resources can help developers make better informed decisions to maximize wind energy production and efficiency while minimizing variable generation.

The intermittent nature of wind power can be problematic for integrating wind power into the electric grid. My amendment addresses this by adding an additional subparagraph that focuses on using computational modeling tools to improve the integration of wind energy systems into the existing electric grid. Investing in technology that focuses on integration of renewable energy into the grid ensures power reliability and brings us closer to achieving a clean energy economy.

Thank you Mr. Chairman, I yield back my time.

Chair BAIRD. I thank the gentleman for his amendment. I also believe this is a constructive and well-crafted amendment, and would be happy to support it myself.

Is there further discussion on the amendment?

If no, the vote occurs on the amendment. All in favor will say aye. Those opposed, no. The ayes have it. The amendment is agreed to.

Any further amendments that other Members wish to offer?

Hearing none, the vote is on the bill H.R. 3165 as amended. All those in favor will say aye. All those opposed, no. In the opinion of the Chair the ayes have it.

I recognize myself to offer a motion. I move the Subcommittee favorably report H.R. 3165 as amended to the Full Committee. Furthermore, I move that the staff be instructed to prepare the Subcommittee report and make necessary technical and conforming changes to the bill in accordance with the recommendations of the Subcommittee.

The question is on the motion to report the bill favorably. Those in favor of the motion will signify by saying aye. Opposed, no. The ayes have it, and the bill is favorably reported.

Without objection the motion to reconsider is laid upon the table. Members will have two subsequent calendar days in which to submit supplemental Minority or additional views on the measure.

I want to thank Members for their attendance, staff for all their good work. This concludes our Subcommittee markup.

[Whereupon, at 2:41 p.m., the Subcommittee was adjourned.]

Appendix:

H.R. 3165, SECTION-BY-SECTION ANALYSIS, AMENDMENT ROSTER

I

111TH CONGRESS
1ST SESSION

H. R. 3165

To provide for a program of wind energy research, development, and demonstration, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

JULY 9, 2009

Mr. TONKO introduced the following bill; which was referred to the Committee on Science and Technology

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A BILL

To provide for a program of wind energy research, development, and demonstration, and for other purposes.

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

SECTION 1. SHORT TITLE.

This Act may be cited as the "Wind Energy Research and Development Act of 2009".

SEC. 2. WIND ENERGY RESEARCH AND DEVELOPMENT PROGRAM.

(a) IN GENERAL.—The Secretary of Energy shall carry out a program of research and development to—

(1) improve the energy efficiency, reliability, and capacity of wind turbines;

(2) optimize the design and adaptability of wind energy systems to the broadest practical range of atmospheric conditions; and

(3) reduce the cost of construction, generation, and maintenance of wind energy systems.

(b) PROGRAM.—The program under this section shall focus on research and development of—

(1) new materials and designs to make larger, lighter, less expensive, and more reliable rotor blades;

(2) technologies to improve gearbox performance and reliability;

(3) automation, materials, and assembly of large-scale components to reduce manufacturing costs;

(4) low-cost transportable towers greater than 100 meters in height to capitalize on improved wind conditions at higher elevations;

(5) advanced computational modeling tools to improve—

(A) the reliability of aeroelastic simulations of wind energy systems; and

(B) understanding of the interaction between each wind turbine component;

(6) advanced control systems and blade sensors to improve performance and reliability under a wide variety of wind conditions;

(7) advanced generators, including—

(A) medium-speed and low-speed generators;

(B) direct-drive technology; and

(C) the use of advanced magnets in generator rotors;

(8) wind technology for offshore applications;

(9) methods to assess and mitigate the effects of wind energy systems on radar and electromagnetic fields; and

(10) wind turbines with a maximum electric power production capacity of 100 kilowatts or less.

SEC. 3. WIND ENERGY DEMONSTRATION PROGRAM.

(a) IN GENERAL.—The Secretary of Energy shall conduct a wind energy demonstration program. In carrying out this section, the Secretary shall ensure that—

(1) the program is of sufficient size to measure wind energy system performance under the full productive range of wind conditions in the United States;

(2) demonstration projects carried out under this program are conducted in collaboration with industry; and

(3) data collected from demonstration projects carried out under this program is useful for carrying out section 2(b).

(b) COST-SHARING.—The Secretary shall carry out the program under this section in compliance with section 988(a) through (d) and section 989 of the Energy Policy Act of 2005 (42 U.S.C. 16352(a) through (d) and 16353).

SEC. 4. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated to the Secretary of Energy to carry out this Act $200,000,000 for each of the fiscal years 2010 through 2014.

○

SECTION-BY-SECTION ANALYSIS OF
H.R. 3165, WIND ENERGY RESEARCH AND
DEVELOPMENT ACT OF 2009

Sec. 1. Short title.

Section 1 states that this Act may be cited as the *"Wind Energy Research and Development Act of 2009."*

Sec. 2. Wind Energy Research and Development Program.

Section 2(a) establishes the overall goals of the Department of Energy's wind energy research and development program.

Section 2(b) identifies focus areas for this program, including: new materials and designs to make larger, lighter, less expensive, and more reliable rotor blades; advanced generators to improve the efficiency of converting blade rotation to electric power; and innovative control systems and blade sensors to improve performance and reliability under a wide variety of wind conditions.

Sec. 3. Wind Energy Demonstration Program.

Section 3 instructs the Secretary to carry out a significant wind energy demonstration program in collaboration with industry following enacted cost-sharing law.

Sec. 4. Authorization of Appropriations.

Section 4 authorizes to be appropriated to the Secretary of Energy to carry out this Act $200,000,000 for each of the fiscal years 2010 through 2014.

COMMITTEE ON SCIENCE AND TECHNOLOGY
ENERGY AND ENVIRONMENT
SUBCOMMITTEE MARKUP
July 21, 2009

AMENDMENT ROSTER

H.R. 3165, the *Wind Energy Research and Development Act of 2009*

No.	Sponsor	Description	Results
1	Mr. Inglis	Amends Section 2 ("Wind Energy Research and Development Program") to add "other research areas as determined by the Secretary" to the list of areas of research and development to be focused on under the research and development program.	Agreed to by voice vote.
2	Mr. Luján	Amends Section 2 to add advanced computational modeling tools to improve "siting of wind energy systems to maximize efficiency and minimize variable generation" and to improve "integration of wind energy systems into the existing electric grid to ensure reliability" as areas of research and development to be focused on under the research and development program.	Agreed to by voice vote.

AMENDMENT TO H.R. 3165

OFFERED BY Mr. Inglis

Page 3, line 15, strike "and".

Page 3, line 17, strike the period and insert "; and".

Page 3, after line 17, insert the following new paragraph:

(11) other research areas as determined by the Secretary.

☒

AMENDMENT TO H.R. 3165

OFFERED BY MR. LUJÁN OF NEW MEXICO

Page 2, line 24, strike ''and''.

Page 3, after line 2, insert the following new subparagraphs:

(C) siting of wind energy systems to maximize efficiency and minimize variable generation; and

(D) integration of wind energy systems into the existing electric grid to ensure reliability;

☒

XXI: PROCEEDINGS OF THE FULL COMMITTEE MARKUP ON H.R. 3165, THE WIND ENERGY RESEARCH AND DEVELOPMENT ACT OF 2009

WEDNESDAY, JULY 29, 2009

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE,
Washington, DC.

The Committee met, pursuant to call, at 10:00 a.m., in Room 2318 of the Rayburn House Office Building, Hon. Bart Gordon [Chair of the Committee] presiding.

Chair GORDON. Good morning. The Committee will come to order.

Pursuant to notice, the Committee on Science and Technology meets to consider the following measures: H.R. 3246, the *Advanced Vehicle Technology Act of 2009;* H.R. 3165, the *Wind Energy Research and Development Act of 2009;* H.R. 3029, *To establish a research, development and technology demonstration program to improve the efficiency of gas turbines used in combined cycle power generation systems,* and H.R. 3247, *To establish a social and behavioral science research program at the Department of Energy, and for other purposes.* We will now proceed with the markup.

This morning the Committee will consider four bills. H.R. 3246, the *Advanced Vehicle Technology Act of 2009,* is authored by our colleague, Mr. Peters, and co-sponsored by Representative Biggert. I think we have a Michigan theme going here. H.R. 3246 authorizes research and development on vehicles with a goal of reducing or eliminating petroleum fuel base and its associated emissions.

We will also consider H.R. 3165, the *Wind Energy Research and Development Act of 2009,* and H.R. 3029, a bill to authorize R&D and to improve the efficiency of gas turbines, both of these bills authored by Mr. Tonko. H.R. 3165 authorizes R&D on wind power. The specific areas of R&D were identified in a recent report by the Department of Energy and the American Wind Energy Association describing the areas of improvements needed if we are to expand wind power electricity generation.

Currently, 15 percent of our electric power is produced from natural gas. Over the next decade, this percentage is predicted to double. The research and development authorized in H.R. 3029 is intended to improve the efficiency of turbines used in these combined cycle power generation systems.

Finally, we will be marking up H.R. 3247, a bill to establish a social and behavioral research program at the Department of Energy. H.R. 3247 was introduced by Dr. Baird, who has been a champion of these areas of research throughout his service on the Committee. It is important to understand why some technologies are more readily adopted than others, and it is important that we communicate to the public clearly about the challenges and oppor-

tunities of becoming a more energy-efficient society. H.R. 3247 will help us to accomplish these important goals.

I now recognize Mr. Hall to present his remarks.

[The prepared statement of Chair Gordon follows:]

PREPARED STATEMENT OF CHAIR BART GORDON

This morning the Committee will consider four bills. H.R. 3246, the *Advanced Vehicle Technology Act of 2009,* is authored by our colleague, Mr. Peters, and co-sponsored by Representative Biggert. I think we have a Michigan theme going here. H.R. 3246 authorizes research and development on vehicles with a goal of reducing or eliminating petroleum fuel base and its associated emissions.

We will also consider H.R. 3165, the *Wind Energy Research and Development Act of 2009,* and H.R. 3029, a bill to authorize R&D and to improve the efficiency of gas turbines, both of these bills authored by Mr. Tonko.

H.R. 3165 authorizes R&D on wind power. The specific areas of R&D were identified in a recent report by the Department of Energy and the American Wind Energy Association describing the areas of improvements needed if we are to expand wind power electricity generation.

Currently, 15 percent of our electric power is produced from natural gas. Over the next decade, this percentage is predicted to double. The research and development authorized in H.R. 3029 is intended to improve the efficiency of turbines used in these combined cycle power generation systems. It is vital that utilities build new plants to be as efficient as possible since the investment costs are high and plants operate for many decades once they are brought online.

Finally, we will be marking up H.R. 3247, a bill to establish a social and behavioral research program at the Department of Energy. H.R. 3247 was introduced by Dr. Baird, who has been a champion of these areas of research throughout his service on the Committee. People determine the success or failure of new technologies. It is important to understand why some technologies are more readily adopted than others. And it is important that we communicate to the public clearly about the challenges and opportunities of becoming a more energy efficient society. H.R. 3247 will help us to accomplish these important goals.

The four bills we have before us today target several important energy research needs. I congratulate the Members for their work on these bills, and I look forward to a productive markup. Thank you all for your attendance and participation this morning.

I now recognize Mr. Hall to present his opening remarks.

Mr. HALL. I thank you, Mr. Chairman.

Today we do meet to mark up these bills that you set out there, and H.R. 3029 is to establish a research, development and technology demonstration program to improve the efficiency of gas turbines used in combined cycle power generation systems, and H.R. 3247, to establish a social and behavioral sciences research program at the Department of Energy. I will have some things to say about that one a little bit later, especially about the author who is a very good friend of mine and may need this bill. I don't know. These two boys from California every now and then I think they need it, even Sensenbrenner sometimes. We are going to have to really look at this. Josh himself does now and then—I mean Roscoe, but he is too old to be up here anyway. I better yield my time back right now.

[The prepared statement of Mr. Hall follows:]

PREPARED STATEMENT OF REPRESENTATIVE RALPH M. HALL

Thank you Mr. Chairman. Today we meet to markup four bills. H.R. 3246, the *Advanced Vehicle Technology Act of 2009;* H.R. 3165, the *Wind Energy Research and Development Act of 2009;* H.R. 3029, *To establish a research, development, and technology demonstration program to improve the efficiency of gas turbines used in combined cycle power generation systems;* and H.R. 3247, *To establish a social and behavioral sciences research program at the Department of Energy, and for other purposes.*

I will not take up a lot of time talking about these bills in my opening statement but will instead make any necessary comments when each bill is brought up.

I would like to thank the staff on both sides for their hard work in getting these bills and their amendments together and ready in such a short period of time.

With that I yield back the balance of my time.

Chair GORDON. Are you sure you don't want to say something about Mr. Neugebauer here before we proceed?

Mr. HALL. He and Boone Pickens got the wind in their problem out in West Texas. Women complain about it blowing their hair.

Chair GORDON. Yes, sir, so here we go. Members can place statements in the record at any point.

[The prepared statement of Mr. Mitchell follows:]

PREPARED STATEMENT OF REPRESENTATIVE HARRY E. MITCHELL

Thank you, Mr. Chairman.

Today we will mark up four pieces of legislation: H.R. 3246, the *Advanced Vehicle Technology Act,* H.R. 3165, the *Wind Energy Research and Development Act,* H.R. 3029, legislation to establish a research, development, and technology demonstration program to improve the efficiency of gas turbines used in combined cycle power generation systems, and H.R. 3247, legislation to establish a social and behavioral sciences research program at the Department of Energy.

I am especially pleased that we are considering H.R. 3165, the *Wind Energy Research and Development Act.*

Wind energy, like solar energy, is a clean alternative energy source that could not only help meet our energy needs, but it could also be a boon to our economy.

According to a May 2008 report from the Department of Energy, current U.S. land-based and offshore wind resources are sufficient to supply the electrical energy needs of the U.S. several times over.

H.R. 3165 would take important steps in advancing wind energy research efforts. Specifically, this bill would require the DOE to focus research and development on improving the energy efficiency, reliability, and capacity of wind turbines, optimizing the design and adaptability of wind energy systems, and reducing the cost of wind energy systems. This legislation would also establish a wind demonstration program.

I urge my colleagues to support this important measure, and I yield back.

Chair GORDON. We will now consider H.R. 3165, the *Wind Energy Research and Development Act of 2009.*

I recognize the gentleman from New York, Mr. Tonko, to describe his bill.

Mr. TONKO. Thank you, Mr. Chairman.

The bill, H.R. 3165, creates the *Wind Energy Research and Development Act of 2009.* The Department of Energy published a report that examines the technical feasibility of using wind energy to generate 20 percent of the Nation's electricity demand by 2030. In response to the DOE report, the American Wind Energy Association published a report indicating that in order to reach that 20 percent goal by 2030, our nation must provide more funding for wind energy research and development and other wind-related programs.

Therefore, this bill, the *Wind Energy Research and Development Act of 2009,* which is endorsed by the American Wind Energy Association, will give the Secretary of Energy to the authority a program of research and development to improve the efficiency, the reliability and the capacity of wind turbines as well as optimize the design and adaptability of wind systems. Ultimately, this will reduce the cost of construction, of generation and of maintenance of systems. The program will focus on research and development of making materials larger, lighter, more reliable and more affordable. It will also work towards improving gearbox reliability and

performance, reducing manufacturing costs and advancing computational modeling tools, among other things. This bill provides $200 million a year for fiscal years 2010 through 2014, an amount that is directly in line with the DOE and AWEA reports. It will help ensure diversity of players in the wind R&D market.

Mr. Chairman, I know that my colleagues, Mr. Smith, Mr. McCaul, Mr. Neugebauer and Mr. Bartlett have amendments to this bill. I thank them for their input and am supportive of those given amendments. Mr. Chairman, I yield back the balance of my time.

[The prepared statement of Mr. Tonko follows:]

PREPARED STATEMENT OF REPRESENTATIVE PAUL D. TONKO

Thank you Mr. Chairman.

Mr. Chairman, my bill is H.R. 3165, the *Wind Energy Research and Development Act of 2009.* The Department of Energy (DOE) published a report that examines the technical feasibility of using wind energy to generate 20 percent of the Nation's electricity demand by 2030.

In response to the DOE report, the American Wind Energy Association published a report indicating that in order to reach the 20 percent goal by 2030 our nation must provide more funding for wind energy research and development and other wind-related programs.

Therefore, my bill, the *Wind Energy Research and Development Act of 2009,* which is endorsed by AWEA, will give the Secretary of Energy the authority to implement a program of research and development to improve the efficiency, reliability and capacity of wind turbines as well as optimize the design and adaptability of wind systems. Ultimately, this will reduce the cost of construction, generation and maintenance of systems.

The program will focus on research and development of making materials larger, lighter, more reliable and more affordable. It will also work towards improving gearbox reliability and performance, reducing manufacturing costs, and advance computational modeling tools, among other things.

The bill provides $200 million a year for fiscal years 2010 through 2014, an amount that is directly in line with the DOE and AWEA reports, and will help ensure a diversity of players in the wind R&D market.

I know that my colleagues Mr. Smith, Mr. McCaul, Mr. Neugebauer and Mr. Bartlett have amendments on this bill. I thank them for their input and am supportive of those amendments.

Mr. Chairman, I yield back the balance of my time.

Chair GORDON. I now recognize Mr. Hall to present any remarks on the bill.

Mr. HALL. Mr. Chairman, I support H.R. 3165, the *Wind Energy Research and Development Act.* Wind energy continues to be a very important part of the electricity-generating portfolio in this country and particularly in my home State of Texas, which is, by the way, the largest producer of wind energy in the country. The technology can be improved upon to make the wind turbines, systems and farms more efficient and more effective at producing energy. We really need to be looking closely at it, just like we need to look at solar for the future. You know, a million bucks for each one of these fans is what I have heard they cost. It takes a long time to get their money back and there is some question about productivity. Even one of the major supporters of wind energy, Mr. Pickens, is easing off it.

This bill addresses the key research areas needed to expand the country's production of wind energy. I thank Mr. Tonko for his work on this important renewable energy source. It is very important, and we need to keep working and trying to get it hooked up

to where it is beneficial to the greatest good for the greatest number. I yield back.

[The prepared statement of Mr. Hall follows:]

PREPARED STATEMENT OF REPRESENTATIVE RALPH M. HALL

Mr. Chairman, I support H.R. 3165, the *Wind Energy Research and Development Act*. Wind energy has been and continues to be an important part of the electricity generating portfolio in this country and in particular, Texas which is the largest producer of wind energy in the country. However, the technology can be improved upon to make the wind turbines, systems and farms more efficient and more effective at producing energy. This bill addresses the key research areas needed to expand our country's production of wind energy and I thank Mr. Tonko for his work on this important renewable energy source.

With that I yield back the balance of my time.

Chair GORDON. Does anyone else wish to be recognized? If not, I ask unanimous consent the bill is considered as read and open to amendment at any point and that the Members proceed with the amendments in the order of the roster. Without objection, so ordered.

The first amendment on the roster is an amendment offered by the gentleman from Texas, Mr. Neugebauer. Are you ready to proceed with your amendment?

Mr. NEUGEBAUER. I am, Mr. Chairman. I have an amendment at the desk.

Chair GORDON. The Clerk will report the amendment.

The CLERK. Amendment to H.R. 3165, amendment number 041, offered by Mr. Neugebauer of Texas.

Chair GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentleman for five minutes to explain the amendment.

Mr. NEUGEBAUER. Well, thank you, Mr. Chairman. As the Congressman that has more wind energy in his district than any other one in the country and the home of the largest wind farm in the world, obviously we are very interested in wind energy in Texas and in the 19th Congressional District. My amendment would make some slight changes and I believe improvements in what I think is a pretty big bill—I mean pretty good bill, I think, and pretty big. That was not a Freudian slip, that was actually—but I am concerned as I mentioned in other legislation that we are authorizing here, and I think it is important that as we authorize this, we authorize in a way that we give the departments that are going to administer this flexibility, as well as our appropriators, in making the right decisions.

When the Subcommittee on Energy and Environment held a hearing on this subject, we heard from various experts on this issue and one of those was a wind engineering professor from my District, and my amendment would address the growing need to assess the issues of up wind and down wind characterizations that happen in these wind farms. In other words, some of the wind turbines in the front of the area where the wind is blowing, there are different wind patterns developed. As those wind turbines are put in grids, we need to understand what is the most efficient way to do that and so I think I would expand the research into that as well.

The other is that we need to make sure that we bring all of the partners together and this basically includes, it would allow universities to be partners in this process and I think that is an important part of that. Also, there are demonstration projects called for in this particular legislation, and while people think all wind is the same, all wind is not the same, and the wind characteristics in certain parts of the country are different than other areas of the country. So I think it would be important in these demonstration projects to make sure that we have a diversity in the geographical location of these programs to assess what are the wind patterns and what are some of the—really, quiet honestly, what are some of the optimum places where the wind technology will be better suited than other kinds of technologies. For example, the wind off the Great Lakes is different than the wind in West Texas so my amendment would also encourage that.

Also, obviously, Mr. Chairman, I fully support an all-of-the-above energy policy, and certainly wind is a piece of that. Solar has been mentioned but there are new technologies or existing technologies that we continue to see in this country. I think we should continue to move in that direction, and so, Mr. Chairman, I think these are provisions that make sure that this is a good bill, and with that, I yield back the balance of my time.

[The prepared statement of Mr. Neugebauer follows:]

PREPARED STATEMENT OF REPRESENTATIVE RANDY NEUGEBAUER

My amendment would make slight changes, and improvements in what I believe is a pretty good bill. Although I remain concerned over its costs, it is my hope that DOE does not overlap existing research currently being conducted by the Department of Energy [authorizes $200 million for 2010–2014 each year]

When the Subcommittee on Energy and Environment held a hearing on this subject, we heard from various subject matter experts on this issue. One of them was a wind engineering professor from my district.

My amendment would address the growing need to assess the issue of upwind and downwind characterizations. Presently, as we know, wind turbines are literally located on used, as well as unused farmland, and although they are positioned in such a way that they in no way interfere with the turbines near them; there are still unknown impacts that occur as a result of these various arrays.

As the witnesses testified, there currently are unexplained decreases in performance and reliability on many wind farms. My amendment would encourage further study in the area of upwind and downwind turbine operations to increase performance in wind energy.

Second, my amendment would address the demonstration programs called for in Section 3 of this legislation. While to the typical layman, all wind is the same, it is in fact not all the same.

The winds that blow in the region that I represent in the Great Plains are not representative of winds that regularly blow off of a Great Lake, or in a particularly mountainous region. My amendment would encourage geographic diversity, which ensures a quality representation of different wind class regimes across the country.

Lastly Mr. Chairman, while I fully support an all-of-the-above energy policy, I also support an all-of-the-above research policy. My amendment would encourage such demonstrations projects to be carried out not only by industry leaders, but also their partners in the academic community.

Thank you Mr. Chairman, I appreciate the Committee's attention to these matters, and I yield back the balance of my time.

Chair GORDON. Thank you, Mr. Neugebauer, and I also thank you for that tutorial on wind. I am ready for Jeopardy now.

Is there anyone else that would like to discuss the amendment?

Mr. BILBRAY. Mr. Chairman.

Chair GORDON. Mr. Bilbray.

Mr. BILBRAY. Mr. Chairman, just quickly, I think that anyone who has been looking at this technology understands that when it first developed there was sort of a breakthrough there in the use of composite technologies, and separate from this, it doesn't specifically address it there but I think there is a reference there in the development. I will just ask the whole Committee to understand that separate from the particulars, I hope to see us move forward with some general research in advanced composites, and here is a technology where composite technology could make huge leaps in not only the efficiency but also the size, the application and everything else. So I bring this up so in the future when we start talking about why even look at research into advanced composites this is one component that I don't think we talk enough about, and I just want to tell both my gentlemen from Texas, the greatest challenge right now for Mr. Pickens is not generating electricity but getting the easements to get into the cities, and this committee needs to work with the other committees of jurisdiction. I am talking about we need to be as forceful with the siting and the alignment for clean energy getting to the cities as we are the freeways that the gentlelady from Texas always talks about, and I yield back.

Chair GORDON. Thank you, Mr. Bilbray. I will point out that with the National Nanotechnology Initiative, we took a major step in terms of composites. I think that is where we are going to see the breakthroughs, and that was a very good bill and we thank you all for helping.

Is there further discussion on the amendment? Dr. Ehlers.

Mr. EHLERS. Thank you, Mr. Chairman. I just want to commend Mr. Neugebauer on the amendments. Clearly, understanding the wake effect is a major factor, and I am surprised it hasn't been addressed thoroughly before and it clearly has to be done. With the geographic diversity, that is genuinely a surprise to people, that the winds in North Dakota are far different from those in Texas. The Texans manage to generate much more wind, of course, but aside from that, it is very important to understand these, and there are other factors that I am sure will emerge that are equally important, and I appreciate Mr. Neugebauer's amendment.

Mr. NEUGEBAUER. Would the gentleman yield?

Mr. EHLERS. Yes, I would be happy to yield.

Mr. NEUGEBAUER. I wanted to clarify. Did you say Texans create more wind or Texas creates more wind? I think there is——

Mr. HALL. I think it is immaterial. They are both true.

Chair GORDON. Okay. Any rebuttal?

Mr. EHLERS. I yield back.

Chair GORDON. Is there further discussion? If there is no further discussion, the vote occurs on the amendment. All in favor, say aye. Opposed, no. The ayes have it and the amendment is agreed to.

The second amendment on the roster is an amendment offered by the gentleman from Nebraska, also where there is a lot of wind. Are you ready to proceed with your amendment, Mr. Smith?

Mr. SMITH of Nebraska. Thank you, Mr. Chairman. This amendment would allow for research and development into the processes for planning and——

Chair GORDON. Do you want to inquire of the Clerk if your amendment is there?

Mr. SMITH of Nebraska. I would, please.

The CLERK. Amendment to H.R. 3165, amendment number 010, offered by Mr. Smith of Nebraska.

Chair GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentleman for five minutes to explain the amendment.

Mr. SMITH of Nebraska. Thank you, Mr. Chairman.

This amendment would allow for R&D into the process for planning and methods to size and scale transmission for remotely located renewable resource-rich areas. The amendment also enables R&D for ways to efficiently and cost-effectively create high-voltage transmission for renewable energy. Nebraska is sixth in the Nation in wind energy potential yet lacks the transmission capacity and development for additional generation. Transmission capacity concerns reside not only in rural Nebraska but across the country as well. In order to become truly energy independent, we must continue to explore all forms of renewable energy including wind.

Mr. Chairman, I appreciate Representative Tonko and the Committee's work on wind energy R&D and would urge adoption of this amendment. I yield back.

[The prepared statement of Mr. Smith follows:]

PREPARED STATEMENT OF REPRESENTATIVE ADRIAN SMITH

Thank you Mr. Chairman. This amendment would allow for research and development into the processes for planning, and methods to size and scale transmission for remotely located renewable resource-rich areas. The amendment also enables research and development for ways to efficiently and cost-effectively create high-voltage transmission for renewable energy.

My home State of Nebraska is sixth in the Nation in wind energy potential, yet lacks in transmission capacity and development for additional generation. Transmission capacity concerns reside not only in rural areas of the Third District of Nebraska, but across the country. In order to become truly energy independent, we must continue to explore all forms of renewable energy, including wind. Mr. Chairman, I appreciate Representative Tonko and the Committee's work on wind energy R&D, and would urge adoption of this amendment.

I yield back my time.

Chair GORDON. Is there further discussion on the amendment? If no, the vote occurs on the amendment. All in favor, say aye. Opposed, no. The ayes have it. The amendment is agreed to.

The third amendment on the roster is an amendment offered by the gentlelady from Texas, Ms. Johnson. Are you ready to proceed with your amendment?

Ms. JOHNSON. I have an amendment at the desk.

Chair GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentlelady for five minutes to explain the amendment.

Ms. JOHNSON. Thank you very much, Chairman Gordon and Ranking Member Hall.

My amendment adds a new section to the wind energy bill that deals with equal opportunity. The amendment states that the Secretary of Energy shall coordinate with the Office of Minority Economic Impact and with the Office of Small and Disadvantaged Business Utilization. The amendment also directs the Secretary to provide special consideration to applications submitted by minority-

serving institutions and businesses. I understand that the Department of Energy has regulations specifying the inclusion of minority groups in its research, development and education programs. However, I would like to see research program officials work more closely with the Office of Economic Impact and Diversity. Many of the professionals who will be applying for these grants are engineers. Only 3.2 percent of the Ph.D. engineers in this country are African-American. I could not even find statistics on the ethnicity and education of employees at DOE's supported national labs. It would be good to know what percentage of scientists working in the national labs are minorities. I say this only because it means a great deal of impact on this nation in the future. DOE shall incorporate greater transparency with regard to its own workforce that is funded, by the way, with taxpayers' money.

I would like also to see greater effort by the Department of Energy program directors to reach out to small minority-owned businesses to inform them of these funding opportunities. In order to do that, there shall be smoother coordination with the Office of Economic Impact and Diversity. My amendment simply facilitates that coordination. I ask my colleagues on this committee to support this amendment and increase the diversity of our research grant recipient pool.

Thank you, Mr. Chairman, and I yield back.

Chair GORDON. Thank you, Ms. Chair, for a good amendment.

Is there further discussion on the amendment? If no, the vote occurs on the amendment. All in favor say aye. All opposed, no. The ayes have it. The amendment is agreed to.

The fourth amendment on the roster is an amendment offered by the gentleman from Maryland, Mr. Bartlett—Dr. Bartlett. Are you ready to proceed with your amendment?

Mr. BARTLETT. I am. I have an amendment at the desk.

Chair GORDON. The Clerk will report the amendment.

The CLERK. Amendment to H.R. 3165, amendment number 002, offered by Mr. Bartlett of Maryland.

Chair GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentleman for five minutes to explain the amendment.

Mr. BARTLETT. Wind power is growing rapidly. The United States alone can already power seven million homes through the power of wind. I support this bill because more is needed to accelerate our harvest of wind energy into electricity. The bill calls for a program on wind energy research and development and a demonstration program in wind energy to provide important opportunities for researchers to contribute to this challenging yet essential process.

This amendment would assure that any monies distributed under this Act are awarded on a competitive basis in order to ensure quality and efficiency as well as promote job growth and economic development. Competition will ensure the greatest benefit to taxpayers at the least expense, and I yield back, Mr. Chairman.

[The prepared statement of Mr. Bartlett follows:]

PREPARED STATEMENT OF REPRESENTATIVE ROSCOE BARTLETT

Wind power is growing rapidly. The U.S. alone can already power seven million homes through the power of wind. I support this bill because more is needed to accelerate our harvest of wind energy into electricity. The bill calls for a program on wind energy research and development and a demonstration program on wind energy to provide important opportunities for researchers to contribute to this challenging yet essential process.

This amendment would ensure that any monies distributed under this Act are awarded on a competitive basis, in order to ensure quality and efficiency as well as promote job growth and economic improvements. Competition will ensure the greatest benefit to taxpayers at the lowest expense.

Chair GORDON. Is there further discussion on the amendment? If no, the vote occurs on the amendment. All in favor say aye. Opposed, no. The ayes have it and the amendment is agreed to.

The fifth amendment on the roster is an amendment offered by the gentleman from Texas, Mr. McCaul. Are you ready to proceed with your amendment?

Mr. MCCAUL. I am, Mr. Chairman. I have an amendment at the desk.

Chair GORDON. The Clerk will report the amendment.

The CLERK. Amendment to H.R. 3165, amendment number 003, offered by Mr. McCaul of Texas.

Chair GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentleman for five minutes to explain the amendment.

Mr. MCCAUL. Thank you, Mr. Chairman.

My amendment is simple. It attempts to make sure that this new program created by this bill coordinates with already existing wind energy programs at the Department of Energy. I believe the United States needs to explore all possible energy sources to increase our energy independence and end our reliance on foreign sources. However, we should make sure that when creating new federal programs, we are not duplicating past efforts or the ongoing efforts of existing programs. That way, each program advances our understanding and brings the technology closer to the point where it becomes economically viable and able to reliably deliver power.

So my amendment seeks to make sure that this program advances our understanding of wind power rather than simply repeating the efforts of the past and current programs, and with that, I yield back.

[The prepared statement of Mr. McCaul follows:]

PREPARED STATEMENT OF REPRESENTATIVE MICHAEL T. MCCAUL

My amendment is simple. It attempts to make sure that the new program created by this bill coordinates with already existing wind energy programs at the Department of Energy. I believe that the United States needs to explore all possible energy sources to increase our energy independence and end our reliance on foreign sources; however we should make sure that, when creating new federal programs, we are not duplicating past efforts or the ongoing efforts of existing programs. That way each program advances our understanding and brings the technology closer to the point where it becomes economically viable and able to reliably deliver power. So my amendment seeks to make sure that this program advances our understanding of wind power rather than simply repeating the efforts of past and current programs.

I yield back the balance of my time.

Chair GORDON. Thank you, Mr. McCaul. That really has been a theme of this committee, is to try to get best use out of limited dollars, and you are right on point.

Mr. MCCAUL. Thank you.

Chair GORDON. Is there further discussion? If no, the vote occurs on the amendment. All in favor say aye. Those opposed, no. The ayes have it. The amendment is agreed to.

Mr. Tonko is recognized.

Mr. TONKO. Thank you, Mr. Chairman. I again thank the Members of the Committee for their amendments, and as I indicated earlier, am in support of those amendments. I also would ask that a letter from the Sustainable Energy and Environment Coalition in the House be put into the record of these proceedings, and it is a letter of support for the given legislation.

Chair GORDON. If no objection, the letter will be made a part of the record.

[The information follows:]

Congress of the United States
Washington, DC 20515

July 29, 2009

The Honorable Bart Gordon
Chairman, Committee on Science and Technology
2306 Rayburn House Office Building
United States Capitol
Washington, D.C. 20515

The Honorable Ralph M. Hall
Ranking Member, Committee on Science and Technology
2405 Rayburn House Office Building
United States Capitol
Washington, D.C. 20515

Dear Chairman Gordon and Ranking Member Hall:

As members of the House of Representatives Sustainable Energy and Environment Coalition (SEEC), we write you to express our support for H.R. 3165, the Wind Energy Research and Development Act of 2009. As our Coalition seeks to advance policies for promoting domestic clean energy innovation and job creation, and to move America toward a cleaner, more independent and secure energy future, we feel that this legislation will further these goals by allowing Americans to better harness one of today's cost-competitive and readily accessible homegrown energy resources: wind energy.

A 2008 report published by the U.S. Department of Energy found that domestically-produced wind energy has the potential to supply power for one-fifth of America's electricity demand by the year 2030. This report also concluded that in order to reach this level of power generation, the United States must realize improvements in the reliability and operability of wind systems, and an increase in the American capacity to manufacture wind turbines.

The Wind Energy Research and Development Act of 2009, as proposed by Congressman Paul Tonko of New York and cosponsored by other SEEC members, will ensure the investments in the research and development necessary to increase the efficiency, reliability and capacity of wind turbines, optimize the design and adaptability of wind systems, and reduce the costs of construction, generation and maintenance of wind systems. This legislation will help to ensure that the United States remains a world leader in wind energy technologies, and will help to create a prosperous new clean energy economy that will revitalize our American manufacturing industries.

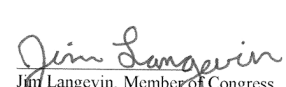
In order for America to lead the world in the production of the energy technologies of the twenty-first century, and to ensure that the jobs of the future are created here in the United States, the members of the Sustainable Energy and Environment Coalition support investments in the research and development of advanced wind energy technologies. Our Coalition thanks the committee for considering the Wind Energy Research and Development Act of 2009, which will help Americans to take hold of a new energy future.

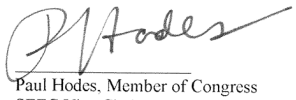
Sincerely,

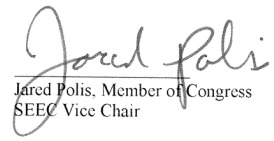
The Members of the Sustainable Energy and Environment Coalition

Jay Inslee, Member of Congress
SEEC Co-Chair

Steve Israel, Member of Congress
SEEC Co-Chair


Jim Langevin, Member of Congress
SEEC Vice Chair


Paul Hodes, Member of Congress
SEEC Vice Chair


Jared Polis, Member of Congress
SEEC Vice Chair


Ben Ray Luján, Member of Congress


Mike Honda, Member of Congress

Chair GORDON. Are there other amendments? If no, the vote is on the bill, H.R. 3165 as amended. All those in favor, say aye. All those opposed, say no. In the opinion of the Chair, the ayes have it.

Now I now recognize Mr. Tonko for a motion.

Mr. TONKO. Thank you, Chairman Gordon. I move that the Committee favorably report H.R. 3165 as amended to the House with the recommendation that the bill do pass. Furthermore, I move that the staff be instructed to prepare the legislative report and make necessary technical and conforming changes and that the Chairman take all necessary steps to bring the bill before the House for consideration.

Chair GORDON. The question is on the motion to report the bill favorably. Those in favor of the motion will signify by saying aye. Opposed, no. The ayes have it and the bill is favorably reported.

Without objection, the motion to reconsider is laid upon the table. Members will have two subsequent calendar days in which to submit supplemental Minority or additional views on the measure.

Chair GORDON. This concludes our Committee markup.

[Whereupon, at 12:53 p.m., the Committee was adjourned.]

Appendix

H.R. 3165 AS AMENDED, AMENDMENT ROSTER

H.R. 3165, AS AMENDED BY THE SUBCOMMITTEE ON ENERGY AND ENVIRONMENT, ON JULY 21, 2009

SECTION 1. SHORT TITLE.

This Act may be cited as the ''Wind Energy Research and Development Act of 2009''.

SEC. 2. WIND ENERGY RESEARCH AND DEVELOPMENT PROGRAM.

(a) IN GENERAL.—The Secretary of Energy shall carry out a program of research and development to—

(1) improve the energy efficiency, reliability, and capacity of wind turbines;

(2) optimize the design and adaptability of wind energy systems to the broadest practical range of atmospheric conditions; and

(3) reduce the cost of construction, generation, and maintenance of wind energy systems.

(b) PROGRAM.—The program under this section shall focus on research and development of—

(1) new materials and designs to make larger, lighter, less expensive, and more reliable rotor blades;

(2) technologies to improve gearbox performance and reliability;

(3) automation, materials, and assembly of large-scale components to reduce manufacturing costs;

(4) low-cost transportable towers greater than 100 meters in height to capitalize on improved wind conditions at higher elevations;

(5) advanced computational modeling tools to improve—

(A) the reliability of aeroelastic simulations of wind energy systems;

(B) understanding of the interaction between each wind turbine component;

(C) siting of wind energy systems to maximize efficiency and minimize variable generation; and

(D) integration of wind energy systems into the existing electric grid to ensure reliability;

(6) advanced control systems and blade sensors to improve performance and reliability under a wide variety of wind conditions;

(7) advanced generators, including—

(A) medium-speed and low-speed generators;

(B) direct-drive technology; and

(C) the use of advanced magnets in generator rotors;

(8) wind technology for offshore applications;

(9) methods to assess and mitigate the effects of wind energy systems on radar and electromagnetic fields;

(10) wind turbines with a maximum electric power production capacity of 100 kilowatts or less; and

(11) other research areas as determined by the Secretary.

SEC. 3. WIND ENERGY DEMONSTRATION PROGRAM.

(a) IN GENERAL.—The Secretary of Energy shall conduct a wind energy demonstration program. In carrying out this section, the Secretary shall ensure that—

(1) the program is of sufficient size to measure wind energy system performance under the full productive range of wind conditions in the United States;

(2) demonstration projects carried out under this program are conducted in collaboration with industry; and

(3) data collected from demonstration projects carried out under this program is useful for carrying out section 2(b).

(b) COST-SHARING.—The Secretary shall carry out the program under this section in compliance with section 988(a) through (d) and section 989 of the Energy Policy Act of 2005 (42 U.S.C. 16352(a) through (d) and 16353).

SEC. 4. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated to the Secretary of Energy to carry out this Act $200,000,000 for each of the fiscal years 2010 through 2014.

COMMITTEE ON SCIENCE AND TECHNOLOGY
FULL COMMITTEE MARKUP
July 29, 2009

AMENDMENT ROSTER

H.R. 3165, the Wind Energy Research and Development Act of 2009

No.	Sponsor	Description	Results
1	Mr. Neugebauer (041)	Amends Section 2 to add advanced computational modeling tools to improve "understanding of the wake effect between upwind and downwind turbine operations" as an area of research and development to be focused on under the research and development program. Amends Section 3 to require the Secretary to ensure that: (1) the demonstration program is of sufficient "geographic diversity" to measure wind energy system performance under the full productive range of wind conditions in the United States; and (2) demonstration projects are located in various geographic areas representing various wind class regimes.	Agreed to by voice vote.
2	Mr. Smith (010)	Amends Section 2 to add "technical processes to enable: (1) scalability of transmission from remotely located renewable resource rich areas; and (2) optimization of advanced infrastructure design, including high voltage transmission" as an area of research and development to be focused on under the research and development program.	Agreed to by voice vote.
3	Ms. Johnson (081)	Adds a new section that requires the Secretary of Energy to coordinate with the Office of Minority Economic Impact and with the Office of Small and Disadvantaged Business Utilizations, and provide special consideration to applications submitted by institutions, businesses, or entities containing majority representation by individuals identified in section 33 or 34 of the Science and Engineering Equal	Agreed to by voice vote.

		Opportunities Act (i.e., women, minorities, persons with disabilities).	
4	**Mr. Bartlett (002)**	**Adds a new section that requires that awards under Section 2 and Section 3 be made on a competitive basis with an emphasis on technical merit.**	**Agreed to by voice vote.**
5	**Mr. McCaul (003)**	**Adds a new section that requires the Secretary of Energy, to the maximum extent practicable, to coordinate activities under the bill with other programs at the Department of Energy and other Federal research programs.**	**Agreed to by voice vote.**

AMENDMENT TO H.R. 3165

OFFERED BY MR. NEUGEBAUER OF TEXAS

Page 2, line 17, strike ''and''.

Page 2, line 20, strike the semicolon and insert ''; and''.

Page 2, after line 20, insert the following new subparagraph:

(E) understanding of the wake effect between upwind and downwind turbine operations;

Page 3, line 19, insert ''and geographic diversity'' after ''sufficient size''.

Page 3, lines 23 through 25, amend paragraph (2) to read as follows:

(2) demonstration projects carried out under this program are—

(A) conducted in collaboration with industry and, as appropriate, with academic institutions; and

(B) located in various geographic areas representing various wind class regimes; and

☒

AMENDMENT TO H.R. 3165

OFFERED BY MR. SMITH OF NEBRASKA

Page 3, line 12, strike ''and''.

Page 3, after line 12, insert the following new paragraph (and redesignate the subsequent paragraph accordingly):

(11) technical processes to enable—

(A) scalability of transmission from remotely located renewable resource rich areas; and

(B) optimization of advanced infrastructure design, including high voltage transmission; and

☒

AMENDMENT TO H.R. 3165

OFFERED BY MS. EDDIE BERNICE JOHNSON OF TEXAS

Page 4, after line 7, insert the following new section (and redesignate the subsequent section accordingly):

SEC. 4. EQUAL OPPORTUNITY.

In carrying out this Act, the Secretary of Energy shall—

(1) coordinate with the Office of Minority Economic Impact and with the Office of Small and Disadvantaged Business Utilization; and

(2) provide special consideration to applications submitted by institutions, businesses, or entities containing majority representation by individuals identified in section 33 or 34 of the Science and Engineering Equal Opportunities Act (42 U.S.C. 1885a or 1885b).

☒

AMENDMENT TO H.R. 3165

OFFERED BY MR. BARTLETT OF MARYLAND

Page 4, after line 7, insert the following new section (and redesignate the subsequent section accordingly):

SEC. 4. COMPETITIVE AWARDS.

Awards under section 2 and section 3 shall be made on a competitive basis with an emphasis on technical merit.

☒

AMENDMENT TO H.R. 3165

OFFERED BY MR. MCCAUL OF TEXAS

Page 4, after line 9, insert the following new section (and redesignate the subsequent section accordingly):

SEC. 4. COORDINATION AND NONDUPLICATION.

To the maximum extent practicable the Secretary of Energy shall coordinate activities under this Act with other programs of the Department of Energy and other Federal research programs.

☒