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REPORT
111–343

HIGH EFFICIENCY GAS TURBINES

DECEMBER 1, 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. 3029]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science and Technology, to whom was referred the bill (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, having considered the same, report favorably thereon with an amendment and recommend that the bill as amended do pass.

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89–006

I. AMENDMENT

The amendment is as follows:

Strike all after the enacting clause and insert the following:

SECTION 1. HIGH EFFICIENCY GAS TURBINES.

(a) IN GENERAL.—The Secretary of Energy shall carry out a multiyear, multiphase program of research, development, and technology demonstration to improve the efficiency of gas turbines used in combined cycle power generation systems and to identify the technologies that ultimately will lead to gas turbine combined cycle efficiency of 65 percent.

(b) PROGRAM ELEMENTS.—The program under this section shall—

(1) support first-of-a-kind engineering and detailed gas turbine design for megawatt-scale and utility-scale electric power generation, including—

(A) high temperature materials, including superalloys, coatings, and ceramics;

(B) improved heat transfer capability;

(C) manufacturing technology required to construct complex three-dimensional geometry parts with improved aerodynamic capability;

(D) combustion technology to produce higher firing temperature while lowering nitrogen oxide and carbon monoxide emissions per unit of output;

(E) advanced controls and systems integration;

(F) advanced high performance compressor technology; and

(G) validation facilities for the testing of components and subsystems;

(2) include technology demonstration through component testing, subscale testing, and full scale testing in existing fleets;

(3) include field demonstrations of the developed technology elements so as to demonstrate technical and economic feasibility; and

(4) assess overall combined cycle system performance.

(c) PROGRAM GOALS.—The goals of the multiphase program established under subsection (a) shall be—

(1) in phase I—

(A) to develop the conceptual design of advanced high efficiency gas turbines that can achieve at least 62 percent combined cycle efficiency on a lower heating value basis; and

(B) to develop and demonstrate the technology required for advanced high efficiency gas turbines that can achieve at least 62 percent combined cycle efficiency on a lower heating value basis; and

(2) in phase II, to develop the conceptual design for advanced high efficiency gas turbines that can achieve at least 65 percent combined cycle efficiency on a lower heating value basis.

(d) PROPOSALS.—Within 180 days after the date of enactment of this Act, the Secretary shall solicit grant and contract proposals from industry, universities, and other appropriate parties for conducting activities under this Act. In selecting proposals, the Secretary shall emphasize—

(1) the extent to which the proposal will stimulate the creation or increased retention of jobs in the United States; and

(2) the extent to which the proposal will promote and enhance United States technology leadership.

(e) COMPETITIVE AWARDS.—The provision of funding under this section shall be on a competitive basis with an emphasis on technical merit.

(f) COST SHARING.—Section 988 of the Energy Policy Act of 2005 (42 U.S.C. 16352) shall apply to an award of financial assistance made under this section.

(g) LIMITS ON PARTICIPATION.—The limits on participation applicable under section 999E of the Energy Policy Act of 2005 (42 U.S.C. 16375) shall apply to financial assistance awarded under this section.

(h) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary for carrying out this section $65,000,000 for each of fiscal years 2011 through 2014.

II. PURPOSE OF THE BILL

The purpose of H.R. 3029 is to establish a research, development, and technology demonstration program to improve the efficiency of gas turbines used in power generation systems.

III. BACKGROUND AND NEED FOR THE LEGISLATION

Natural gas is playing an increasingly important role in the nation's electric generation portfolio. Gas-fired plants now comprise about 20% of the total electric generation portfolio in the U.S. after falling from 24% in 1970 to 12% in 1985. The majority of electric generation capacity additions in the last decade have been gas-fired. For example, the Energy Information Administration (EIA) reported that, in 2000, of the 23,453 megawatts of total new electric capacity added in the U.S. almost 95 percent, or 22,238 MW were natural gas-fired additions. In 2009 it is estimated that over 50 percent of additions will be gas-fired. Given the likelihood of tightening environmental regulations on power plants and the recent confirmation of sizeable new domestic natural gas resources, the EIA estimates that natural gas-fired electricity generation will increase dramatically over the next 20 years.

The use of natural gas for electricity production has a number of benefits. Like coal, most natural gas used in the United States is domestically produced and estimates of domestic reserves are increasing. However, natural gas is generally cleaner than other fossil fuels, with significantly lower emissions of carbon dioxide (CO_2), nitrogen oxides (NO_X), sulfur dioxide (SO_2) and other pollutants and particulates. Furthermore, natural gas-fired plants can be constructed and commissioned in relatively short periods of time and require comparatively lower levels of capital investment than other large centralized electric generation facilities. Gas plants also have high operating flexibility, including the ability to power up and down in short periods of time.

Natural gas is used to generate electricity in a variety of ways. The first is through a steam generation unit, where natural gas is burned in a boiler to heat water and produce steam. The steam is then used to turn a turbine to generate electricity. The second is through gas turbines where, instead of heating steam to turn a turbine, natural gas is mixed with air and ignited, which increases the temperature, velocity and volume of the gas flow. The hot gas is then used to turn the turbine directly, and generate electricity. The final way is through combined-cycle units that utilize both a gas turbine and a steam unit. The gas turbine operates in much the same way as a normal gas turbine, using the hot gases released from burning natural gas to turn a turbine and generate electricity. However, in combined-cycle plants, the waste heat from the gas turbine process is used to generate steam, which is then used to generate electricity much like a steam unit, resulting in significantly higher efficiency than simple steam generation or gas turbine cycles alone.

Efficiency enhancements for both combined cycle and simple cycle gas turbine units could result in significantly reduced natural gas usage and emissions. For example, General Electric estimates that a one-percentage point improvement in efficiency applied to its existing F Class fleet would result in CO_2 emission reductions of 4.4 million tons per year, while also providing savings of more than a billion dollars per year in fuel costs.

In 1992, the Department of Energy, through the Office of Fossil Energy and the Office of Energy Efficiency & Renewable Energy, developed the Advanced Turbine Systems Program to address a

temperature barrier that, for all practical purposes, capped efficiencies for turbine-based power generating systems. Above 2300 degree F, conventional cooling technologies were insufficient to protect the turbine blades and other internal components from heat degradation. Because higher temperatures generally correlate with higher efficiencies (ie. faster turbine speeds), this effectively limited the generating efficiency at which a turbine power plant could convert the energy in the fuel into electricity.

Nine years after the development of the Advanced Turbine Systems Program, the Department of Energy and its private partners produced "breakthrough" turbine systems that pushed firing temperatures to 2,600 degrees F and permitted combined cycle efficiencies that surpassed 60%. Among the innovations that emerged from the Department's Advanced Turbine Systems program were single-crystal turbine blades and thermal barrier coatings (TBC) that could withstand the high inlet temperatures, along with new firing techniques to stabilize combustion and minimize nitrogen oxide formation.

IV. COMMITTEE ACTIONS

H.R. 3029 was introduced on June 24, 2009 by Representative Paul Tonko.

On July 21, 2009 the Subcommittee on Energy and Environment met to consider H.R. 3029. No amendments were offered. The bill was favorably reported by voice vote to the Full Committee.

On July 29, 2009 the Full Committee met to consider H.R. 3029. The following three amendments were offered:

1. An amendment by Mr. Bilbray specifying that the program support first-of-a-kind engineering and detailed gas turbine design for "megawatt-scale" electric power generation, in addition to utility-scale electric power generation. The amendment was adopted by voice vote.

2. An amendment by Mr. Bilbray requiring that funding under the bill be provided on a competitive basis with an emphasis on technical merit. The amendment was adopted by voice vote.

3. An amendment by Ms. Kosmas requiring the Secretary to solicit grant and contract proposals from "industry, universities, and other appropriate parties" for activities under the bill. The amendment was adopted by voice vote.

The bill, as amended, was favorably reported by voice vote to the House.

V. SUMMARY OF MAJOR PROVISIONS OF THE BILL, AS REPORTED

H.R. 3029 requires the Secretary of Energy to carry out a multiyear, multiphase program of research, development, and technology demonstration to improve the efficiency of gas turbines used in power generation systems and to identify the technologies that will ultimately lead to gas turbine combined cycle efficiency of 65 percent.

The bill requires that the program support engineering and gas turbine design for utility-scale and megawatt-scale electric power generation. Under the bill, this includes high temperature materials, improved heat transfer capability, manufacturing technology, combustion technology, advanced controls and systems integration, advanced high performance compressor technology, and validation

facilities for the testing of components and subsystems. It also requires that the program include technology and field demonstrations, and assess overall combined cycle system performance.

H.R. 3029 sets out specific program goals. In Phase I, the goal is to develop the conceptual design of and demonstrate the technology required for advanced high efficiency gas turbines that can achieve at least 62 percent combined cycle efficiency on a lower heating value basis. In Phase II, the goal is to develop the conceptual design for advanced high efficiency gas turbines that can achieve at least 65 percent combined cycle efficiency.

The bill requires that the Secretary solicit proposals from industry, universities, and other appropriate parties for activities under the program within 180 days of enactment. The bill requires the Secretary, in selecting proposals, to emphasize the extent to which the proposal will stimulate the creation or increased retention of jobs in the United States and the extent to which the proposal will promote and enhance United States technology leadership. Awards shall be made on a competitive basis with emphasis on technical merit.

H.R. 3029 authorizes $65 million for each of fiscal years 2011 through 2014 for carrying out the program.

VI. SECTION-BY-SECTION ANALYSIS, AS REPORTED

Section 1. High efficiency gas turbines

(a) Instructs the Secretary of Energy to carry out a program of research, development, and technology demonstration to improve the efficiency of gas turbines and to identify the technologies with the potential to improve efficiency of 65%.

(b) Outlines the program elements to include engineering and design activities for both megawatt and utility-scale turbines in high temperature materials, heat transfer, manufacturing technology, combustion technology, controls and systems integration, compressor technology, and validation facilities. Calls for technology demonstrations on multiple scales, field demonstrations, and overall performance assessments.

(c) States the goals of the program to be, in Phase I, the design, development and demonstration of gas turbine technologies with efficiency of at least 62%; and in Phase II, design of gas turbine technologies with efficiency of at least 65%.

(d) Instructs the Secretary to solicit proposals from universities, industry and other appropriate parties, and calls for applicants to emphasize the extent to which proposals will stimulate job creation or retention in the U.S., and promote U.S. technological leadership.

(e) Specifies that funding shall be on a competitive basis with emphasis on technical merit.

(f) Specifies that cost-sharing requirements will be in accordance with Section 988 of Energy Policy Act of 2005.

(g) Limits participation to companies that are U.S.-owned, or owned by a parent entity organized under the laws of a country that affords the U.S. similar rights.

(h) Authorizes $65 million per year for the fiscal years 2011 through 2014.

VII. COMMITTEE VIEWS

It is the Committee's view that natural gas will likely account for an increasing percentage of the nation's electric generation, and that advances to make natural gas-fired power plants more efficient will result in an overall cleaner, more secure energy portfolio in the U.S. The efficiency goals stated in the bill represent very significant improvements in turbine efficiency, while likely being technologically achievable with more research and development.

The Department of Energy has engaged in various activities to increase the efficiency of natural gas turbines in the past, with promising results. However, current federal efforts are not sufficient to advance the state of the technology far beyond what is currently available, and many stakeholders in the turbine industry are not likely to undertake the necessary activities on their own. Therefore, a more robust and focused Department of Energy effort is needed to improve efficiencies of the nation's natural gas-fired power plants. Furthermore, it is the committee's view that DOE-sponsored research and development activities in gas turbines should result in technological advancements that can be quickly deployed in new turbine systems and, if possible, retrofitted onto existing fleets of turbines.

While very sizable efficiency gains can be made in large, utility-scale combined cycle systems, a comprehensive federal program should seek advances in multiple scales of systems, and in both combined and simple cycle. Furthermore, the program should take into account the diversity of stakeholders and the role of small businesses in driving innovation in the turbine industry. In that regard, the Secretary should carefully consider how to leverage the resources of a range of turbine manufacturers.

VIII. 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 IX of this report pursuant to House Rule XIII, clause 3(c)(3).

H.R. 3029 does not contain new budget authority, credit authority, or changes in revenues or tax expenditures. Assuming that the sums authorized under the bill are appropriated, H.R. 3029 does authorize additional discretionary spending, as described in the Congressional Budget Office report on the bill, which is contained in Section IX of this report.

IX. 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. 3029, a bill to establish a research, development, and technology demonstration program to improve the efficiency of gas turbines used in combined cycle power generation systems.

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. 3029—A bill to establish a research, development, and technology demonstration program to improve the efficiency of gas turbines used in combined cycle power generation systems

Summary: H.R. 3029 would authorize the appropriation of $260 million over the 2011–2014 period for the Department of Energy (DOE) to improve the efficiency of turbines that use natural gas to generate electricity. Assuming appropriation of the authorized amounts, CBO estimates that implementing the legislation would cost $221 million over the 2010–2014 period and $39 million after 2014. Enacting the legislation would not affect direct spending or revenues.

H.R. 3029 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. 3029 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	0	65	65	65	65	260
Estimated Outlays	0	36	55	65	65	221

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. 3029 would authorize the appropriation of $65 million a year over the 2011–2014 period for research, development, and demonstration activities related to gas turbines. The bill would direct DOE to establish a research and development program to improve the efficiency of turbines that use natural gas to generate electricity. The bill also would require DOE to demonstrate the feasibility of implementing new gas turbine technologies.

Intergovernmental and private-sector impact: H.R. 3029 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.

X. COMPLIANCE WITH PUBLIC LAW 104–4

H.R. 3029 contains no unfunded mandates.

XI. COMMITTEE OVERSIGHT FINDINGS AND RECOMMENDATIONS

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

XII. STATEMENT ON GENERAL PERFORMANCE GOALS AND OBJECTIVES

Pursuant to clause 3(c) of House rule XIII, the goal of H.R. 3029 is to establish a research, development, and technology demonstration program to improve the efficiency of gas turbines used in power generation systems.

XIII. CONSTITUTIONAL AUTHORITY STATEMENT

Article I, section 8 of the Constitution of the United States grants Congress the authority to enact H.R. 3029.

XIV. FEDERAL ADVISORY COMMITTEE STATEMENT

H.R. 3029 does not create any advisory committees.

XV. CONGRESSIONAL ACCOUNTABILITY ACT

The Committee finds that H.R. 3029 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).

XVI. EARMARK IDENTIFICATION

H.R. 3029 does not contain any congressional earmarks, limited tax benefits, or limited tariff benefits as defined in House rule XII, clause 9.

XVII. STATEMENT ON PREEMPTION OF STATE, LOCAL, OR TRIBAL LAW

The bill is not intended to preempt any State, local, or tribal law.

XVIII. COMMITTEE RECOMMENDATIONS

On July 29, 2009, the Committee on Science and Technology favorably reported H.R. 3029, as amended, by voice vote, and recommended its enactment.

XIX: PROCEEDINGS OF THE MARKUP BY THE SUBCOMMITTEE ON ENERGY AND ENVIRONMENT ON 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

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 important 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. Chair, 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 generating power 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 Chair'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. Chair.

[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. 3029, *To establish a research, development, and technology demonstration program to improve the efficiency of gas turbines used in combined cycle power generation systems.* Again, Mr. Tonko is at a markup regrettably, but we have had a very successful hearing on these kinds of issues, and I applaud him for his leadership on this legislation.

Clearly if we can improve the efficiency of gas turbines, we can save a great deal of energy and reduce our ocean acidification and global warming gases.

I would now recognize Mr. Inglis to present any remarks on the bill.

Mr. INGLIS. Thank you, Mr. Chair. This bill creates a competitive program with the aim of identifying and achieving the significant technological and materials breakthroughs that are necessary to boost gas turbine combined cycle efficiency. Higher gas turbine efficiency will help us get the most out of our domestic natural gas resources, generate jobs in engineering and turbine design, and leverage U.S. technological expertise to keep us competitive in the global market.

I am happy to be a co-sponsor of this important legislation, and I yield back, Mr. Chair.

[The prepared statement of Mr. Inglis follows:]

PREPARED STATEMENT OF REPRESENTATIVE BOB INGLIS

This bill creates a competitive program with the aim of identifying and achieving the significant technological and materials breakthroughs necessary to boost gas turbine combined cycle efficiency. Higher gas turbine efficiency will help us get the most out of our domestic natural gas resources, generate jobs in engineering and turbine design, and leverage U.S. technological expertise to keep us competitive in the global market. I'm happy to be a co-sponsor of this important legislation.

Chair BAIRD. I thank the gentleman from South Carolina.

[The prepared statement of Mr. Tonko follows:]

PREPARED STATEMENT OF REPRESENTATIVE PAUL D. TONKO

Thank you, Mr. Chairman.

Mr. Chairman, my bill, H.R. 3029, would establish a research, development, and technology demonstration program to improve the efficiency of gas turbines used in combined cycle power generation systems. This legislation is vital if our country is once again going to be an energy technology leader in the world. Currently, the United States uses natural gas for nearly 20 percent of its power generation. The most advanced gas turbines based systems at this time are capable of reaching 60 percent efficiency.

The goal of this bill is for those same turbines to achieve 65 percent combined cycle efficiency. If this five percent increase of efficiency is achieved, we will see numerous benefits as a country.

First, a one percentage-point improvement in efficiency would result in CO_2 emissions reductions of 4.4 million tons per year and substantial reductions in other emissions such as NO_X and SO_X. The technologies developed for this new program can be an essential part of our response to climate change, both in this country and around the world.

Secondly, the energy and fuel savings created by more efficient turbines will help rate payers save more than a billion dollars per year in fuel costs. Deployment of a 65 percent efficient gas turbine throughout the country would result in significant reductions in fuel use, leading to savings in electricity costs of $180 billion through the year 2040.

Third, this bill promotes U.S. technology leadership, putting the U.S. in a position to assume a greater share of the worldwide energy market by creating and retaining high value domestic jobs in turbine manufacturing.

Finally, I would like to thank Ranking Member Inglis for co-sponsoring this legislation.

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

Chair BAIRD. Does anyone else wish to be recognized?

If not, I ask unanimous consent that the bill is considered as read and open to amendment at any point. Without objection, so ordered.

Are there any amendments that anyone wishes to offer to this legislation?

If no, the vote is on the bill, H.R. 3029. All those in favor say aye. All those opposed will say 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. 3029 to the Full Committee. Furthermore, I move 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. 3029, Section-by-Section Analysis

I

111TH CONGRESS
1ST SESSION

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.

IN THE HOUSE OF REPRESENTATIVES

JUNE 24, 2009

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

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A BILL

To establish a research, development, and technology demonstration program to improve the efficiency of gas turbines used in combined cycle power generation systems.

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

SECTION 1. HIGH EFFICIENCY GAS TURBINES.

(a) IN GENERAL.—The Secretary of Energy shall carry out a multiyear, multiphase program of research, development, and technology demonstration to improve the efficiency of gas turbines used in combined cycle power generation systems and to identify the technologies that

ultimately will lead to gas turbine combined cycle efficiency of 65 percent.

(b) PROGRAM ELEMENTS.—The program under this section shall—

(1) support first-of-a-kind engineering and detailed gas turbine design for utility-scale electric power generation, including—

(A) high temperature materials, including superalloys, coatings, and ceramics;

(B) improved heat transfer capability;

(C) manufacturing technology required to construct complex three-dimensional geometry parts with improved aerodynamic capability;

(D) combustion technology to produce higher firing temperature while lowering nitrogen oxide and carbon monoxide emissions per unit of output;

(E) advanced controls and systems integration;

(F) advanced high performance compressor technology; and

(G) validation facilities for the testing of components and subsystems;

(2) include technology demonstration through component testing, subscale testing, and full scale testing in existing fleets;

(3) include field demonstrations of the developed technology elements so as to demonstrate technical and economic feasibility; and

(4) assess overall combined cycle system performance.

(c) PROGRAM GOALS.—The goals of the multiphase program established under subsection (a) shall be—

(1) in phase I—

(A) to develop the conceptual design of advanced high efficiency gas turbines that can achieve at least 62 percent combined cycle efficiency on a lower heating value basis; and

(B) to develop and demonstrate the technology required for advanced high efficiency gas turbines that can achieve at least 62 percent combined cycle efficiency on a lower heating value basis; and

(2) in phase II, to develop the conceptual design for advanced high efficiency gas turbines that can achieve at least 65 percent combined cycle efficiency on a lower heating value basis.

(d) PROPOSALS.—Within 180 days after the date of enactment of this section, the Secretary shall solicit proposals for conducting activities under this section. In selecting proposals, the Secretary shall emphasize—

(1) the extent to which the proposal will stimulate the creation or increased retention of jobs in the United States; and

(2) the extent to which the proposal will promote and enhance United States technology leadership.

(e) COST SHARING.—Section 988 of the Energy Policy Act of 2005 (42 U.S.C. 16352) shall apply to an award of financial assistance made under this section.

(f) LIMITS ON PARTICIPATION.—The limits on participation applicable under section 999E of the Energy Policy Act of 2005 (42 U.S.C. 16375) shall apply to financial assistance awarded under this section.

(g) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary for carrying out this section $65,000,000 for each of fiscal years 2011 through 2014.

○

SECTION-BY-SECTION ANALYSIS OF
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

SECTION 1. HIGH EFFICIENCY GAS TURBINES

(a) Instructs the Secretary of Energy to carry out a program of technology research, development, and demonstration to improve the efficiency of gas turbines and to identify the technologies with the potential to improve efficiency of 65 percent.

(b) Outlines the program elements to include engineering and design activities in high temperature materials, heat transfer, manufacturing technology, combustion technology, controls and systems integration, compressor technology, and validation facilities. Calls for technology demonstrations on multiple scales, field demonstrations, and overall performance assessments.

(c) States the goals of the program to be, in Phase I, the design, development and demonstration of gas turbine technologies with efficiency of at least 62 percent; and in Phase II, design of gas turbine technologies with efficiency of at least 65 percent.

(d) Calls for applicants to emphasize the extent to which proposals will stimulate job creation or job retention in the U.S., and promote U.S. technological leadership.

(e) Specifies that cost-sharing requirements will be in accordance with Section 988 of the *Energy Policy Act of 2005*.

(f) Limits participation to firms that are U.S.-owned, or owned by a parent entity organized under the laws of a country that affords U.S.-owned firms similar rights.

(g) Authorizes $65 million per year for the fiscal years 2011 through 2014.

XX: PROCEEDINGS OF THE FULL COMMITTEE MARKUP ON 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

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 opportunities 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. Chair.

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, and 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 be-*

havioral 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. 3029, *To establish a research, development and technology demonstration program to improve the efficiency of gas turbines used in combined cycle power generation systems.* I recognize the gentleman from New York, Mr. Tonko, to describe the bill.

Mr. TONKO. Thank you, Mr. Chair. You just highlighted the core substance of H.R. 3029. This legislation is vital if our country is once again going to be an energy technology leader in the world.

Currently, the United States uses natural gas for nearly 20 percent of its power generation. The most advanced gas turbine-based systems at this time are capable of reaching 60 percent efficiency. The goal of this bill is for those same turbines to achieve 65 percent combined cycle efficiency. A one percentage point improvement in efficiency would result in CO_2 emissions reductions of 4.4 million tons per year and substantial reductions in other emissions such as NO_X and SO_X. The energy and fuel savings created by more efficient turbines will help rate payers save more than $1 billion per year in fuel costs. Deployment of a 65 percent efficient gas turbine throughout the country would result in significant reductions in fuel use, leading to savings in electricity costs of somewhat $180 billion through the year 2040. In addition to the environmental benefits, energy and fuel savings, this bill promotes United States technology leadership, putting the United States in a position to

assume a greater share of the worldwide energy market by creating and retaining high-value domestic jobs in turbine manufacturing.

I know that my colleagues, Mr. Bilbray and Ms. Kosmas, have amendments to the bill. I thank them for their input and again am supportive of their amendments.

Mr. Chair, 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, H.R. 3029, would establish a research, development, and technology demonstration program to improve the efficiency of gas turbines used in combined cycle power generation systems. This legislation is vital if our country is once again going to be an energy technology leader in the world. Currently, the United States uses natural gas for nearly 20 percent of its power generation. The most advanced gas turbines based systems at this time are capable of reaching 60 percent efficiency. The goal of this bill is for those same turbines to achieve 65 percent combined cycle efficiency.

A one percentage-point improvement in efficiency would result in CO_2 emissions reductions of 4.4 million tons per year and substantial reductions in other emissions such as NO_X and SO_X.

The energy and fuel savings created by more efficient turbines will help rate payers save more than a billion dollars per year in fuel costs. Deployment of a 65 percent efficient gas turbine throughout the country would result in significant reductions in fuel use, leading to savings in electricity costs of $180 billion through the year 2040.

In addition, to the environmental benefits, energy and fuel savings this bill promotes U.S. technology leadership, putting the U.S. in a position to assume a greater share of the worldwide energy market by creating and retaining high value domestic jobs in turbine manufacturing.

I know that my colleagues Mr. Bilbray and Ms. Kosmas 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. Thank you, Mr. Tonko.

Mr. Hall is recognized.

Mr. HALL. Mr. Chair, I support 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* with a footnote. I will admit that at first I was a little apprehensive in that it seemed as though the bill would benefit one company, but we have been assured that this is not the case. My colleague, Mr. Bilbray, will also be offering an amendment that will expand the number of entities eligible to participate in the program. While I would have preferred a hearing to discuss the merits of this bill before its last-minute inclusion in the Waxman-Markey cap-and-trade bill and before the Subcommittee markup last week, I won't oppose what I consider a very worthy goal of efficiency enhancements to gas turbine combined cycle units, which could result in significantly reduced natural gas usage and CO_2 emissions.

Again, I thank Mr. Tonko for his work on the bill. He has been a very busy man. With that, I yield back my time.

[The prepared statement of Mr. Hall follows:]

PREPARED STATEMENT OF REPRESENTATIVE RALPH M. HALL

Mr. Chairman, I support 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* with a footnote. I will admit that at first I was a little apprehensive in that it seemed as though the bill would benefit one company, but I have been assured that that is not the case. My colleague, Mr.

Bilbray will also be offering an amendment that will expand the number of entities eligible to participate in the program. While I would have preferred a hearing to discuss the merits of this bill before its last-minute inclusion in the Waxman-Markey cap-and-trade bill and before the Subcommittee markup last week, I will not oppose what I consider a worthy goal of efficiency enhancements to gas turbine combined cycle units which could result in significantly reduced natural gas usage and CO_2 emissions. Again, I thank Mr. Tonko for his work on this bill. You have been a very busy man.

With that I yield back the balance of my time.

[The prepared statement of Mr. Inglis follows:]

PREPARED STATEMENT OF REPRESENTATIVE BOB INGLIS

This bill creates a competitive program with the aim of identifying and achieving the significant technological and materials breakthroughs necessary to boost gas turbine combined cycle efficiency. Higher gas turbine efficiency will help us get the most out of our domestic natural gas resources, generate jobs in engineering and turbine design, and leverage U.S. technological expertise to keep us competitive in the global market. I'm happy to be a co-sponsor of this important legislation.

Chair GORDON. Does anyone else wish to be recognized? Then I ask unanimous consent that the bill is considered as read and open to amendment at any point and that the Members proceed with the amendments in order of the roster. Without objection, so ordered.

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

Mr. BILBRAY. Yes, Mr. Chair, I have an amendment at the desk.

Chair GORDON. The Clerk will report the amendment.

The CLERK. Amendment to H.R. 3029, amendment number 032, offered by Mr. Bilbray of California.

Mr. BILBRAY. I will ask unanimous consent that the——

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

I recognize the gentleman from California to explain his amendment.

Mr. BILBRAY. Excuse me, Mr. Chair. Once a mayor, always a mayor.

First of all, for public disclosure, I want to make it clear that as far as I know, I own no stock in natural gas in any form but I do take exception to the Committee's report on paragraph 2 on this bill where it makes a reference to the fact that the use of natural gas for electrical generation produces generally cleaner. Let me say this. It is extremely cleaner than other fossil fuels, so just for the record, I want to let everybody know, this is a great technology from an air pollution point of view.

My amendment just tries to make sure that the research does not pick out just large units but also recognizes that we need a diversity in units, especially the fact, Mr. Chair, that we are going to need natural gas to be able to fill the gap between those other zero-emission technologies that are available that tend to be larger and fill those gaps into where you can have smaller units that are much closer to the source of consumption, thus reducing the inefficiency of long transmission. This research just sort of gives the flexibility that we should be looking at large, medium and small and not restricted to one size, and with that, basically it is self-explanatory. This is an application that I think we are going to find not just in mega cities but applications in those rural areas that will need a clean alternative to large, centralized generation facili-

ties, and this technology can produce it and produce it in a manner that is what we call turnkey. Basically gas turbine is very, very efficient for those smaller units, and I yield back, Mr. Chair.

Chair GORDON. Thank you, Mr. Bilbray. Is there further discussion on the amendment? All in favor, say aye. Those opposed, no. The ayes have it and the amendment is agreed to.

The second amendment on the roster is an amendment offered also by the gentleman from California, Mr. Bilbray. Are you ready to proceed with your amendment?

Mr. BILBRAY. Yes, Mr. Chair.

Chair GORDON. The Clerk will report the amendment.

The CLERK. Amendment to H.R. 3029, amendment number 001, offered by Mr. Bilbray of California.

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. BILBRAY. Mr. Chair, this is very simple. I think it stands in the spirit of everyone here and that is that there should be competitive bidding in this process and we keep this open, competitive. Competition is not only a very efficient way of doing it, it is what our taxpayers have always demanded. We keep it open, we keep it competitive, keep the system honest. That speaks for itself. I yield back.

Chair GORDON. Is there further discussion on the amendment? 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.

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

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

Chair GORDON. The Clerk will report the amendment.

The CLERK. Amendment to H.R. 3029, amendment number 002, offered by Ms. Kosmas of Florida.

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

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

Ms. KOSMAS. Thank you, Mr. Chair. I would like to thank Mr. Tonko for introducing this important bill that will advance new energy efficiency technology and move Americans down the path to energy independence.

My amendment to H.R. 3029 will enable businesses and universities to participate in and help shape this new R&D program by requiring the Secretary of Energy to solicit grant and contract proposals from industry, universities and other appropriate parties. The addition of these institutions will ensure that our entire knowledge base is utilized to advance energy-efficient technology. Clean energy technology is a growing field and we must do all that we can to support such an important industry. For example, small businesses such as Florida Turbine Technologies and universities such as the University of Central Florida can provide valuable expertise and real-world experience that can make substantial contributions to DOE's research programs and the overall energy sector.

Investing in and improving the efficiency of abundant domestic energy sources such as natural gas and harnessing the innovative capabilities of small businesses and universities is vital to developing new technologies that will create jobs, reduce greenhouse gases and strengthen national security. I ask my colleagues for their support, and I yield back.

[The prepared statement of Ms. Kosmas follows:]

PREPARED STATEMENT OF REPRESENTATIVE SUZANNE M. KOSMAS

Thank you Mr. Chairman. And I would like to thank Mr. Tonko for introducing such an important bill that will advance new energy efficiency technology and move Americans down the path to energy independence.

My amendment to H.R. 3029 will enable businesses and universities to participate in and help shape this new R&D program by requiring the Secretary of Energy to solicit grant and contract proposals from industry, universities, and other appropriate parties. The addition of these institutions will ensure that our entire knowledge base is utilized to advance energy efficient technologies.

Clean energy technology is a growing field and we must do all we can to support such an important industry. Small businesses such as Florida Turbine Technologies and universities such as the University of Central Florida can provide valuable expertise and real world experience that can make substantial contributions to DOE's research programs and the overall energy sector.

Investing in and improving the efficiency of abundant domestic energy sources such as natural gas and harnessing the innovative capabilities of small businesses and universities is vital to developing new technologies that will create jobs, reduce greenhouse gases, and strengthen national security.

I ask my colleagues for their support and I yield back.

Chair GORDON. Thank you, Ms. Kosmas.

Is there further discussion? If note, the vote occurs on the amendment—oh, excuse me. Ms. Biggert.

Ms. BIGGERT. Thank you, Mr. Chair. I just have one question of the author, and that is, you talk about the universities and others. Are the National labs included in this, do you know?

Ms. KOSMAS. I think there is nothing in my language that would prohibit that.

Ms. BIGGERT. I just wondered if it was in the bill, or why they wouldn't have been included in the amendment.

Ms. KOSMAS. I didn't consider it, frankly, but I don't think there is anything in my amendment that would prevent that from being made part of it.

Chair GORDON. If Ms. Biggert would yield, why don't we let Mr. King address that.

The COUNSEL. There is nothing in the bill that would preclude National labs from being included or eligible, but it is not explicitly stated that they are, so——

Ms. BIGGERT. All right. Thank you.

Chair GORDON. Thank you, Ms. Biggert. I think we both agree that our National labs are great resources for the country.

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

Are there other amendments? If no, the vote is on the bill, H.R. 3029 as amended. All those in favor, say aye. All those opposed will say no. In the opinion of the Chair, the ayes have it.

I now recognize Mr. Tonko for a motion.

Mr. TONKO. Thank you, Chair Gordon. I move that the Committee favorably report H.R. 3029 as amended to the House with the recommendation that the bill do pass. Furthermore, I move

that staff be instructed to prepare the legislative report and make necessary technical and conforming changes and that the Chair take all necessary steps to bring the bill before the House for consideration.

Chair GORDON. Thank you, Mr. Tonko.

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. 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

Amendment Roster

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

AMENDMENT ROSTER

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

No.	Sponsor	Description	Results
1	Mr. Bilbray (032)	Amends subsection (b) to specify that the program is to support first-of-a-kind engineering and detailed gas turbine design for "megawatt-scale" electric power generation, in addition to utility-scale electric power generation.	Agreed to by voice vote.
2	Mr. Bilbray (001)	Adds a new subsection to require that funding under the bill be provided on a competitive basis with an emphasis on technical merit.	Agreed to by voice vote.
3	Ms. Kosmas	Amends subsection (d) to require the Secretary to solicit grant and contract proposals from "industry, universities, and other appropriate parties" for activities under the bill.	Agreed to by voice vote.

AMENDMENT TO H.R. 3029

OFFERED BY MR. BILBRAY OF CALIFORNIA

Page 2, line 6, insert ''megawatt-scale and'' after ''turbine design for''.

☒

AMENDMENT TO H.R. 3029

OFFERED BY MR. BILBRAY OF CALIFORNIA

Page 4, after line 10, insert the following new subsection (and redesignate the subsequent subsections accordingly):

1 (e) COMPETITIVE AWARDS.—The provision of fund-
2 ing under this section shall be on a competitive basis with
3 an emphasis on technical merit.

AMENDMENT TO H.R. 3029

OFFERED BY MS. KOSMAS OF FLORIDA

Page 4, lines 1 through 3, strike the first sentence of subsection (d) and insert the following: ''Within 180 days after the date of enactment of this Act, the Secretary shall solicit grant and contract proposals from industry, universities, and other appropriate parties for conducting activities under this Act.''.

☒