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REPORT
110–303

SOLAR ENERGY RESEARCH AND ADVANCEMENT ACT OF 2007

AUGUST 3, 2007.—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. 2774]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science and Technology, to whom was referred the bill (H.R. 2774) to support the research, development, and commercial application of solar energy technologies, 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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I. AMENDMENT

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 "Solar Energy Research and Advancement Act of 2007".

SEC. 2. DEFINITIONS.

For purposes of this Act:

(1) The term "Department" means the Department of Energy.

(2) The term "Secretary" means the Secretary of Energy.

SEC. 3. THERMAL ENERGY STORAGE RESEARCH AND DEVELOPMENT PROGRAM.

(a) ESTABLISHMENT.—The Secretary shall establish a program of research and development to provide lower cost and more viable thermal energy storage technologies to enable the shifting of electric power loads on demand and extend the operating time of concentrating solar power electric generating plants.

(b) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary for carrying out this section $5,000,000 for fiscal year 2008, $7,000,000 for fiscal year 2009, $9,000,000 for fiscal year 2010, $10,000,000 for fiscal year 2011, and $12,000,000 for fiscal year 2012.

SEC. 4. CONCENTRATING SOLAR POWER COMMERCIAL APPLICATION STUDIES.

(a) INTEGRATION.—The Secretary shall conduct a study on methods to integrate concentrating solar power into regional electricity transmission systems, and to identify new transmission or transmission upgrades needed to bring electricity from high concentrating solar power resource areas to growing electric power load centers throughout the United States. The study shall analyze and assess cost-effective approaches for management and large-scale integration of concentrating solar power into regional electric transmission grids to improve electric reliability, to efficiently manage load, and to reduce demand on the natural gas transmission system for electric power. The Secretary shall submit a report to Congress on the results of this study not later than 12 months after the date of enactment of this Act.

(b) WATER CONSUMPTION.—Not later than 6 months after the date of the enactment of this Act, the Secretary of Energy shall transmit to Congress a report on the results of a study on methods to reduce the amount of water consumed by concentrating solar power systems.

SEC. 5. SOLAR ENERGY CURRICULUM DEVELOPMENT AND CERTIFICATION GRANTS.

(a) ESTABLISHMENT.—The Secretary shall establish in the Office of Solar Energy Technologies a competitive grant program to create and strengthen solar industry workforce training and internship programs in installation, operation, and maintenance of solar energy products. The goal of this program is to ensure a supply of well-trained individuals to support the expansion of the solar energy industry.

(b) AUTHORIZED ACTIVITIES.—Grant funds may be used to support the following activities:

(1) Creation and development of a solar energy curriculum appropriate for the local educational, entrepreneurial, and environmental conditions, including curriculum for community colleges.

(2) Support of certification programs, such as the North American Board of Certified Energy Practitioners, for individual solar energy system installers, instructors, and training programs.

(3) Internship programs that provide hands-on participation by students in commercial applications.

(4) Activities required to obtain certification of training programs and facilities by the Institute of Sustainable Power or an equivalent industry-accepted quality-control certification program.

(5) Incorporation of solar-specific learning modules into traditional occupational training and internship programs for construction-related trades.

(6) The purchase of equipment necessary to carry out activities under this section.

(7) Support of programs that provide guidance and updates to solar energy curriculum instructors.

(c) ADMINISTRATION OF GRANTS.—Grants may be awarded under this section for up to 3 years. The Secretary shall award grants to ensure sufficient geographic distribution of training programs nationally. Grants shall only be awarded for programs certified by the Institute of Sustainable Power or an equivalent industry-accepted quality-control certification institution, or for new and growing programs with a credible path to certification. Due consideration shall be given to women, underrepresented minorities, and persons with disabilities.

(d) REPORT.—The Secretary shall make public, via the website of the Department or upon request, information on the name and institution for all grants awarded under this section, including a brief description of the project as well as the grant award amount.

(e) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary for carrying out this section $10,000,000 for each of the fiscal years 2008 through 2012.

SEC. 6. DAYLIGHTING SYSTEMS AND DIRECT SOLAR LIGHT PIPE TECHNOLOGY.

(a) ESTABLISHMENT.—The Secretary shall establish a program of research and development to provide assistance in the demonstration and commercial application of direct solar renewable energy sources to provide alternatives to traditional power generation for lighting and illumination, including light pipe technology, and to promote greater energy conservation and improved efficiency. All direct solar renewable energy devices supported under this program shall have the capability to provide measurable data on the amount of kilowatt-hours saved over the traditionally powered light sources they have replaced.

(b) REPORTING.—The Secretary shall transmit to Congress an annual report assessing the measurable data derived from each project in the direct solar renewable energy sources program and the energy savings resulting from its use.

(c) DEFINITIONS.—For purposes of this section—

(1) the term "direct solar renewable energy" means energy from a device that converts sunlight into useable light within a building, tunnel, or other enclosed structure, replacing artificial light generated by a light fixture and doing so without the conversion of the sunlight into another form of energy; and

(2) the term "light pipe" means a device designed to transport visible solar radiation from its collection point to the interior of a building while excluding interior heat gain in the nonheating season.

(d) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary for carrying out this section $3,500,000 for each of the fiscal years 2008 through 2012.

SEC. 7. SOLAR AIR CONDITIONING RESEARCH AND DEVELOPMENT PROGRAM.

(a) ESTABLISHMENT.—The Secretary shall establish a research, development, and demonstration program to promote less costly and more reliable decentralized distributed solar-powered air conditioning for individuals and businesses.

(b) AUTHORIZED ACTIVITIES.—Grants made available under this section may be used to support the following activities:

(1) Advancing solar thermal collectors, including concentrating solar thermal and electric systems, flat plate and evacuated tube collector performance.

(2) Achieving technical and economic integration of solar-powered distributed air-conditioning systems with existing hot water and storage systems for residential applications.

(3) Designing and demonstrating mass manufacturing capability to reduce costs of modular standardized solar-powered distributed air conditioning systems and components.

(4) Improving the efficiency of solar-powered distributed air-conditioning to increase the effectiveness of solar-powered absorption chillers, solar-driven compressors and condensors, and cost-effective precooling approaches.

(5) Researching and comparing performance of solar-powered distributed air conditioning systems in different regions of the country, including potential integration with other onsite systems, such as solar, biogas, geothermal heat pumps, and propane assist or combined propane fuel cells, with a goal to develop site-specific energy production and management systems that ease fuel and peak utility loading.

(c) COST SHARING.—The non-Federal share of research and development projects supported under this section shall be not less than 20 percent, and for demonstration projects shall be not less than 50 percent.

(d) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary for carrying out this section $2,500,000 for each of the fiscal years 2008 through 2012.

SEC. 8. PHOTOVOLTAIC DEMONSTRATION PROGRAM.

(a) IN GENERAL.—The Secretary shall establish a program of grants to States to demonstrate advanced photovoltaic technology.

(b) REQUIREMENTS.—

(1) ABILITY TO MEET REQUIREMENTS.—To receive funding under the program under this section, a State must submit a proposal that demonstrates, to the satisfaction of the Secretary, that the State will meet the requirements of subsection (f).

(2) COMPLIANCE WITH REQUIREMENTS.—If a State has received funding under this section for the preceding year, the State must demonstrate, to the satisfaction of the Secretary, that it complied with the requirements of subsection (f) in carrying out the program during that preceding year, and that it will do so in the future, before it can receive further funding under this section.

(3) FUNDING ALLOCATION.—Each State submitting a qualifying proposal shall receive funding under the program based on the proportion of United States population in the State according to the 2000 census. In each fiscal year, the portion of funds attributable under this paragraph to States that have not submitted qualifying proposals in the time and manner specified by the Secretary shall be distributed pro rata to the States that have submitted qualifying proposals in the specified time and manner.

(c) COMPETITION.—If more than $25,000,000 is available for the program under this section for any fiscal year, the Secretary shall allocate 75 percent of the total amount of funds available according to subsection (b)(3), and shall award the remaining 25 percent on a competitive basis to the States with the proposals the Secretary considers most likely to encourage the widespread adoption of photovoltaic technologies.

(d) PROPOSALS.—Not later than 6 months after the date of enactment of this Act, and in each subsequent fiscal year for the life of the program, the Secretary shall solicit proposals from the States to participate in the program under this section.

(e) COMPETITIVE CRITERIA.—In awarding funds in a competitive allocation under subsection (c), the Secretary shall consider—

(1) the likelihood of a proposal to encourage the demonstration of, or lower the costs of, advanced photovoltaic technologies; and

(2) the extent to which a proposal is likely to—

(A) maximize the amount of photovoltaics demonstrated;

(B) maximize the proportion of non-Federal cost share; and

(C) limit State administrative costs.

(f) STATE PROGRAM.—A program operated by a State with funding under this section shall provide competitive awards for the demonstration of advanced photo-voltaic technologies. Each State program shall—

(1) require a contribution of at least 60 percent per award from non-Federal sources, which may include any combination of State, local, and private funds, except that at least 10 percent of the funding must be supplied by the State;

(2) endeavor to fund recipients in the commercial, industrial, institutional, governmental, and residential sectors;

(3) limit State administrative costs to no more than 10 percent of the grant;

(4) report annually to the Secretary on—

(A) the amount of funds disbursed;

(B) the amount of photovoltaics purchased; and

(C) the results of the monitoring under paragraph (5);

(5) provide for measurement and verification of the output of a representative sample of the photovoltaics systems demonstrated throughout the average working life of the systems, or at least 20 years; and

(6) require that applicant buildings must have received an independent energy efficiency audit during the 6-month period preceding the filing of the application.

(g) UNEXPENDED FUNDS.—If a State fails to expend any funds received under subsection (b) or (c) within 3 years of receipt, such remaining funds shall be returned to the Treasury.

(h) REPORTS.—The Secretary shall report to Congress 5 years after funds are first distributed to the States under this section—

(1) the amount of photovoltaics demonstrated;

(2) the number of projects undertaken;

(3) the administrative costs of the program;

(4) the amount of funds that each State has not received because of a failure to submit a qualifying proposal, as described in subsection (b)(3);

(5) the results of the monitoring under subsection (f)(5); and

(6) the total amount of funds distributed, including a breakdown by State.

(i) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary for the purposes of carrying out this section—

(1) $15,000,000 for fiscal year 2008;
(2) $30,000,000 for fiscal year 2009;
(3) $45,000,000 for fiscal year 2010;
(4) $60,000,000 for fiscal year 2011; and
(5) $70,000,000 for fiscal year 2012.

II. PURPOSE

The purpose of the H.R. 2774 is to support the research, development, and commercial application of solar energy technologies.

III. BACKGROUND AND NEED FOR THE LEGISLATION

The first two sections of H.R. 2774 are specifically related to furthering the development of concentrating solar power (CSP). A 2006 report by the Western Governors' Association assessed the overall near-term potential for CSP capacity in the American Southwest, taking into account areas of high solar ray intensity, near-level land, non-sensitivity to CSP use, and proximity to transmission. The resulting set of potential plant sites totaled 200 GW of potential power production. To put this in perspective, the electric generating capacity of the entire United States is currently about 1,000 GW. Some significant challenges remain to widespread implementation of CSP, however.

CSP plants produce electric power by converting the sun's energy into high-temperature heat using various mirror configurations. The heat is then channeled through a conventional generator. These plants consist of two parts: one that collects solar energy and converts it to heat, and another that converts heat energy to electricity. Thermal energy storage technology allows this heat to be retained for later use in generating electricity, such as during periods of passing clouds or into the evening. The Energy Policy Act of 2005 establishes a CSP research and development program, but storage is not included in the language. Witnesses at a hearing before the Subcommittee on June 19, 2007 agreed that storage technology is critical to the viability of CSP as a significant energy option. Dr. Dan Arvizu, the Director of the National Renewable Energy Laboratory, noted that "the ability of CSP technologies to store energy presents an opportunity . . . [to] produce baseload power at about 5 cents per kilowatt-hour. Such systems would include 13–17 hours of thermal storage and would compete with the cost of power from coal plants using carbon sequestration technology. It is expected that an aggressive R&D program could achieve the cost goal by 2020." H.R. 2774 establishes a program dedicated to advancing research and development in thermal energy storage for CSP, authorizing $5 million for this program in fiscal year (FY) 2008, and steadily increasing to $12 million in FY 2012.

The bill also tasks the Department of Energy (DOE) with conducting two studies. The first would examine methods to integrate concentrating solar power with regional electricity transmission systems, and to identify new transmission or transmission upgrades needed to bring electricity from high concentrating solar power resource areas to growing electric power load centers throughout the United States. Along with Dr. Arvizu, Mr. Herbert Hayden, Solar Technology Coordinator for the Arizona Public Serv-

ice (APS), lent his support to this study, explaining that: "Intermittent renewable resources such as wind and solar present special economic challenges for transmission investment because they do not efficiently utilize the transmission investment at all times . . . We believe CSP has a significant potential to provide large amounts of renewable energy to the U.S. and that a Federal study on transmission for large scale CSP would be beneficial and appropriate."

The second study would report on methods to reduce the amount of water consumed by concentrating solar power systems, given the strain on water resources in the Southwest. As in typical power plants, water is a necessary component in CSP plants, as the heat collected is used to boil water, and this steam pushes turbines which generate electricity. A significant amount of water is usually also used as a cooling agent to transfer waste heat in the plant's thermodynamic cycle to the environment. A CSP plant with wet (typical) cooling can use 800–1000 gallons of water per MWh. Mr. Hayden and Dr. Arvizu both agreed that minimizing water usage is an important factor in reducing cost and making CSP a more attractive option in the desert climates where such plants will most likely be built. The results of both of these studies will help define a roadmap for large-scale implementation of CSP to meet the Nation's growing energy needs.

The third component of H.R. 2774 addresses the solar industry in general. Having a certified, well-trained workforce to install and maintain solar energy products is critical to the success of the industry. DOE estimates that approximately 5,000 trained installers may be needed by 2015 to accomplish its new Solar America Initiative, and to date, there are just 365 certified solar electric installers and 40 certified solar thermal installers in the U.S.

Some States, such as New York and Florida, working with local community colleges, businesses, the Interstate Renewable Energy Council (IREC), and the North American Board of Certified Energy Practitioners (NABCEP) have recently established successful programs to create a workforce to meet local demand, however there is currently no Federal program dedicated to helping establish or improve these training programs across the Nation. H.R. 2774 creates such a program, authorizing $10 million in each year from FY 2008 through FY 2012. The bill instructs DOE to ensure sufficient geographic distribution of training programs nationally. DOE will award grants to expand programs certified by the Institute of Sustainable Power or equivalent industry-accepted quality-control certification institutions, or to establish new programs with a credible path to certification. At the hearing, testimony supporting this provision was given by Ms. Jane Weissman, Executive Director of the Interstate Renewable Energy Council and Vice-Chair of the North American Board of Certified Energy Practitioners, as well as from Professor Joseph Sarubbi, Chair of the Building Systems Technology Department at Hudson Valley Community College. Ms. Weissman said that "if market past performance continues and current projections are realized, [current] training opportunities fall far short of expected demand for qualified workers . . . We need more classroom and hands-on training tailored to meet local labor needs . . ." She also noted that "training needs to be based

on industry standards so that students are taught the right skills with the right equipment."

In summary, the research, demonstration, and education provisions in H.R. 2774 take several steps beyond what was included in the Energy Policy Act of 2005 to make solar power a more viable option in the Nation's energy portfolio.

IV. Hearing Summary

The Energy and Environment Subcommittee held a hearing on Tuesday, June 19, 2007 to hear testimony on a Discussion Draft of this legislation from the following witnesses:

- Mr. Herbert Hayden is the Arizona Public Service (APS) Solar Technology Coordinator. Mr. Hayden testified on how thermal storage research and development and the bill's proposed studies on grid integration and water usage will help advance the implementation of concentrating solar power.
- Mr. Rhone Resch is the President of the Solar Energy Industries Association (SEIA). Mr. Resch testified on the status of the solar industry in general, and on how a proposed research and information program for the industry would help to support research and promote the adoption of solar power across the Nation.
- Ms. Jane Weissman is the Executive Director of the Interstate Renewable Energy Council (IREC), and the Vice-Chair of the North American Board of Certified Energy Practitioners (NABCEP). Ms. Weissman testified on the current status of workforce training in solar installation and maintenance across the country, and the need for a national solar workforce training program.
- Prof. Joseph Sarubbi is the Chair of the Building Systems Technology Department at Hudson Valley Community College. Prof. Sarubbi testified on his ground-level experience in creating a solar workforce training program, including his partnership with local businesses and the State of New York in developing a successful curriculum.
- Dr. David Arvizu is the Director of the Department of Energy's National Renewable Energy Laboratory. Dr. Arvizu testified on the DOE's current solar research and development activities, and on his views regarding the proposed legislation.

Witnesses at this hearing agreed that thermal storage technology is critical to the viability of CSP as a significant energy option. Dr. Arvizu noted that "the ability of CSP technologies to store energy presents an opportunity . . . [to] produce baseload power at about 5 cents per kilowatt-hour. Such systems would include 13–17 hrs of thermal storage and would compete with the cost of power from coal plants using carbon sequestration technology. It is expected that an aggressive R&D program could achieve the cost goal by 2020." Mr. Hayden further described the importance of storage technology for CSP.

Along with Dr. Arvizu, Mr. Hayden lent his support to the CSP grid integration study as well, explaining that: "Intermittent renewable resources such as wind and solar present special economic challenges for transmission investment because they do not efficiently utilize the transmission investment at all times . . . We believe CSP has a significant potential to provide large amounts of renewable energy to the U.S. and that a federal study on transmission for large scale CSP would be beneficial and appropriate."

Mr. Hayden and Dr. Arvizu also agreed that minimizing water usage is an important factor in reducing cost.

Testimony supporting a workforce training component was given by Ms. Weissman and Professor Sarubbi. Ms. Weissman said that "if market past performance continues and current projections are realized, [current] training opportunities fall far short of expected demand for qualified workers . . . We need more classroom and hands-on training tailored to meet local labor needs . . ." She noted that DOE estimates that 5,000 trained installers could be needed by 2015 to meet the goals of its Solar America Initiative, and to date, we have only 365 certified solar electric installers and 40 certified solar thermal installers. She also noted that "training needs to be based on industry standards so that students are taught the right skills with the right equipment."

Mr. Resch provided testimony on the growth opportunities for the solar industry as a whole in the United States, as well as on the need for a solar research and information program, also known as a "check-off program", modeled after several similar product promotion programs for agricultural products that are funded by industry and managed in conjunction with the U.S. Department of Agriculture. He explained that such a program would pool industry resources to increase awareness of solar energy as an option across the Nation, and ensure that consumers know what quality control standards to look for in the purchase and installation of solar energy equipment.

V. Committee Actions

On June 19, 2007, Rep. Gabrielle Giffords introduced H.R. 2774, *The Solar Energy Research and Advancement Act of 2007.*

The Subcommittee on Energy and Environment met to consider H.R. 2774 on June 21, 2007 and consider the following amendment to the bill:

1. An amendment offered by Ms. Giffords, to direct the Secretary of Energy to establish a grant program to support the creation and strengthening of solar industry workforce training and internship programs across the Nation in installation, operation, and maintenance of solar energy products. The goal of this program is to ensure a supply of well-trained individuals to support the expansion of the solar energy industry. *The amendment was agreed to by voice vote.*

Ms. Woolsey moved that the Subcommittee favorably report the bill, H.R. 2774, to the Full Committee on Science and Technology. The motion was agreed to by a voice vote.

On Wednesday, June 27, 2007 the full Committee on Science and Technology met to consider H.R. 2774. The following amendments were offered to the bill:

1. An amendment offered by Mr. Bartlett that adds a new section creating a program which supports the commercial application of direct solar lighting technology during the day to light buildings, skipping any conversion to electricity and back to light. *Adopted by voice vote.*

2. An amendment offered by Mr. Bartlett that adds a new section creating a research and development program in solar air conditioning. *Adopted by voice vote.*

3. An amendment offered by Mr. Inglis which strikes the section of the bill that establishes a solar workforce training program. *Defeated by recorded vote of 7–17.*

4. An amendment offered by Ms. Johnson which amends the workforce training program section to require that information about grants awarded under the program be made publicly available. *Adopted by voice vote.*

5. An amendment offered by Ms. Johnson which adds the words "cost-effective" and "large-scale" to the section requesting a concentrating solar power integration study. *Adopted by voice vote.*

6. An amendment offered by Ms. Johnson which ensures that the workforce development programs give due consideration to women, underrepresented minorities and persons with disabilities. *Adopted by voice vote.*

7. An amendment offered by Mr. Hall which changes the thermal energy storage program into a general renewable energy storage research and development program, with the same authorization levels. *Offered and withdrawn.*

8. An amendment offered by Mr. Hall for Mr. Smith of Texas which adds a new section creating a nationwide photovoltaics demonstration program, with money divided among all States that submit qualified proposals to the Department of Energy. *Adopted by voice vote.*

9. An amendment offered by Mr. Wu which clarifies that community colleges are eligible for solar workforce training grants. *Adopted by voice vote.*

The bill was approved for final passage by voice vote. Ms. Giffords moved that the Committee favorably report the bill H.R. 2774, as amended, to the House for consideration. The motion was agreed to by voice vote.

VI. Summary of Major Provisions of the Bill, As Reported

H.R. 2774 directs the Secretary to establish a research and development program on thermal energy storage technologies for concentrating solar power (CSP), authorizing $5 million for this program in FY 2008, increasing each year and reaching an authorization level of $12 million in FY 2012. The Secretary is also tasked with conducting two CSP studies. One study will determine the necessary steps to integrate CSP plants with the regional and national electric grid, and the other will examine ways to reduce water usage in CSP plants. The third component of the bill establishes a program to create and strengthen solar industry workforce training and internship programs in installation, operation, and maintenance of solar energy products. The program is authorized for $10 million in each year from FY 2008 through FY 2012. In addition, the bill creates a research and development program in solar air conditioning, authorizing $2.5 million in each year from FY 2008 through FY 2012; a program to support the commercial application of direct solar lighting technology, authorizing $3.5 million in each year from FY 2008 through FY 2012; and a nationwide solar demonstration program, authorizing $15 million in FY 2008, increasing each year and reaching an authorization level of $70 million in FY 2012.

VII. Section-by-Section Analysis

SECTION 1. SHORT TITLE

Act may be cited as the "Solar Energy Research and Advancement Act of 2007".

SECTION 2. DEFINITIONS

Provides definitions for the following terms used in the Act: 'Department' and 'Secretary'.

SECTION 3. THERMAL ENERGY STORAGE RESEARCH AND DEVELOPMENT PROGRAM

Section 3(a) instructs the Secretary to establish a research and development program on thermal energy storage technologies for concentrating solar power. Section 3(b) authorizes appropriations of $5,000,000 in FY 2008, $7,000,000 in FY 2009, $9,000,000 in FY 2010, $10,000,000 in FY 2011, and $12,000,000 in FY 2012.

SECTION 4. CONCENTRATING SOLAR POWER COMMERCIAL APPLICATION STUDIES

Section 4(a) instructs the Secretary to conduct a study that will determine the necessary steps to integrate concentrating solar power plants with the regional and national electric grid. Results of shall be submitted to Congress no later than 12 months after the date of enactment of this Act. Section 4(b) instructs the Secretary to conduct a study on methods to reduce the amount of water consumed by concentrating solar power plants. Results of shall be submitted to Congress no later than 6 months after the date of enactment of this Act.

SECTION 5. SOLAR ENERGY CURRICULUM DEVELOPMENT AND CERTIFICATION GRANTS

Section 5(a) instructs the Secretary to establish a competitive grant program to support the creation and strengthening of solar industry workforce training and internship programs in installation, operation, and maintenance of solar energy products. Section 5(b) describes authorized activities for these grant funds, including support of curriculum development, certification programs, and internship programs. Section 5(c) describes the administration of grants, instructing the Secretary to ensure sufficient geographic distribution of training programs nationally, and to only award grants to certified training programs or new and growing programs with a credible path to certification. Section 5(d) instructs the Secretary to make information on grants awarded under this program publicly available. Section 5(e) authorizes $10 million for this program in each fiscal year from FY 2008 through FY 2012.

SECTION 6. DAYLIGHTING SYSTEMS AND DIRECT SOLAR LIGHT PIPE TECHNOLOGY

Section 6(a) establishes a research and development program to assist the demonstration and commercial application of direct solar lighting technology. Section 6(b) instructs the Secretary to transmit an annual report on the energy savings of each project funded by this program. Section 6(c) provides definitions for "direct solar re-

newable energy" and "light pipe". Section 6(d) authorizes $3.5 million for this program in each fiscal year from FY 2008 through FY 2012.

SECTION 7. SOLAR AIR CONDITIONING RESEARCH AND DEVELOPMENT PROGRAM

Section 7(a) establishes a research, development, and demonstration program in solar-powered air conditioning. Section 7(b) describes authorized activities for these grant funds, including advancing solar thermal collectors, integrating with other electric and thermal systems, enabling mass manufacturing capability, and improving energy efficiency. Section 7(c) states that the non-Federal share of funding to support research and development projects under this program shall not be less than 20 percent, and for demonstration projects shall be not less than 50 percent. Section 7(d) authorizes $2.5 million for this program in each fiscal year from FY 2008 through FY 2012.

SECTION 8. PHOTOVOLTAIC DEMONSTRATION PROGRAM

Section 8(a) establishes a program of grants to States to demonstrate advanced photovoltaic technology. Section 8(b) states that each State submitting qualifying proposals shall receive funding under this program based on the proportion of the U.S. population in the State according to the 2000 census. Section 8(c) instructs the Secretary to allocate 25 percent of program funds to be awarded on a competitive basis if more the $25 million is available for this program in any fiscal year. Section 8(d) instructs the Secretary to solicit initial proposals within 6 months after the enactment of this Act. Section 8(e) describes criteria that the Secretary shall use in competitively awarding funds, including the likelihood a proposal will encourage demonstration of advanced solar technologies, the proportion of the non-Federal cost share, and the State's administrative costs. Section 8(f) describes criteria that States with funding under this section will use in awarding competitive grants, including a required 60 percent minimum non-Federal cost share, a maximum of 10 percent in State administrative costs, and a requirement that applicant buildings must have received an independent energy efficiency audit during the 6–month period preceding the filing of the application. Section 8(g) returns any funds that a State fails to expend under this program within 3 years of receipt to the Treasury. Section 8(h) instructs the Secretary to report the results of this program to Congress 5 years after funds are first distributed to the States. Section 8(i) authorizes appropriations of $15,000,000 in FY 2008, $30,000,000 in FY 2009, $45,000,000 in FY 2010, $60,000,000 in FY 2011, and $70,000,000 in FY 2012.

VIII. Committee Views

The Committee believes it is essential to diversify the sources of energy we use to generate electricity. The growth in demand for energy has led to considerable strain on the current electrical grid, especially during peak hours of demand. Establishing alternative and decentralized sources of electric generating power could alleviate problems associated with grid reliability, as well as reduce greenhouse gas emissions. With these goals in mind, the Com-

mittee notes that the U.S. has the potential to significantly increase its use of solar energy, especially in the southwestern region of the country.

While the U.S. has supported solar energy research and development programs for many years through DOE, the Committee identified several key areas that are not receiving sufficient support. The Energy Policy Act of 2005 authorized a research and development program in concentrating solar power, which DOE has established, but research in storage technology crucial to the success of CSP was not authorized, and thus far the Department has only allocated a small fraction of the funding necessary for such research in thermal storage to have a significant impact.

Given the massive potential for CSP to first reduce strain on the electric grid, and to eventually provide significant baseload power, the Committee also believes a study on grid integration is prudent at this time. In addition, the Committee understands that water is a precious resource in the American Southwest, and looks forward to the results of a study that will describe what, if any, additional steps need to be taken by the federal government or private industry to reduce water usage in CSP plants.

On expanding the solar industry in general, the Committee notes that there is currently no significant federal program dedicated to the establishment of certified solar workforce training programs across the country. The Committee believes that such programs are essential to ensuring proper installation and maintenance of solar energy products, to expanding the use of solar energy in residences and by businesses, and to increasing public confidence in the reliability of solar power. The impending shortage in trained solar panel installers is also a serious concern. The Committee expects that federal grants for such training programs will primarily go to community colleges, which may partner with local businesses, universities, and governments to ensure that their solar curricula and certification programs are appropriate for the local conditions.

The Committee believes it is also essential to encourage the use of technologies that promote increased energy efficiency, and therefore supports the demonstration and commercial application of direct solar renewable energy devices such as solar light pipes. These pipes convert sunlight into useable light within buildings, tunnels, and other enclosed structures, replacing artificial light generated by a light fixture. The pipes make direct use of sunlight, without the conversion of the sunlight into another form of energy, which is a much more efficient method than indirect use of solar energy (or other energy sources) to create electricity. While windows are the most obvious "direct solar lighting" option near the exterior of a building, this technology would allow the use of direct solar light throughout its interior. The Committee recognizes that DOE has already conducted much of the basic research and development necessary for light pipe technology to begin to be applied, though this next step has not been sufficiently supported yet, and so it encourages any funding for a dedicated program on this technology to focus more substantially on demonstration and commercial application.

The Committee notes that the intensity of solar radiation and the use of air conditioning usually peak at the same time. The use of solar energy to drive air conditioning systems has significant po-

tential to reduce peak load electricity demands and contribute to greater resiliency of the grid. DOE currently has no significant research, development, and/or demonstration program to promote this technology, and so the Committee believes that the creation of such a program is essential to provide less costly and more reliable solar driven air conditioning systems for individuals and businesses. The Committee also notes that the establishment of this program has the support of the Western Renewables Group, the States' Energy Council, and several other industry groups.

The Committee also encourages the broader demonstration of solar energy technologies across the country to increase the public and private sector's confidence in their reliability, and to reduce costs. Therefore, it supports the establishment of a competitive grant program to encourage state governments and private industry to team up to demonstrate advanced photovoltaic technologies. While the DOE currently does have several targeted photovoltaic demonstration programs, including its Solar America Cities initiative, this new program would go a step further by encouraging every state in the nation to be involved in such demonstration projects through significant financial incentives. Because the grants are competitive, there is further incentive for states and utilities to pledge more than the minimum amount required in this program.

Lastly, the Committee continues to express support for research and development to improve cost-performance of solar technology, including lower cost solar module nano-manufacturing technologies. The Committee further finds that improving cost-performance for solar modules will support the development of grid parity solar systems.

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. 2774 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. 2774 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

H.R. 2774—Solar Energy Research and Advancement Act of 2007

Summary: H.R. 2774 would authorize the appropriation of $347 million over the 2008–2012 period for the Department of Energy (DOE) to support the research, development, and utilization of solar energy technology. Of that amount, the majority of funds would be awarded to states to distribute grants for the purchase of photovoltaic technologies (solar cells that convert light energy into electricity).

Assuming appropriation of the authorized amounts, CBO estimates that implementing H.R. 2774 would cost $17 million in 2008 and $276 million over the 2008–2012 period. Enacting H.R. 2774 would not affect direct spending or revenues.

H.R. 2774 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act (UMRA) and would benefit state and local governments.

Estimated cost to the Federal Government: The estimated budgetary impact of H.R. 2774 is shown in the following table. The costs of this legislation fall within budget function 270 (energy).

	By fiscal year, in millions of dollars—				
	2008	2009	2010	2011	2012
CHANGES IN SPENDING SUBJECT TO APPROPRIATION					
Grant and Demonstration Programs:					
Authorization Level	28	43	58	73	83
Estimated Outlays	12	30	46	61	74
Thermal Energy Storage and Solar Energy Research and Development:					
Authorization Level	9	11	13	14	16
Estimated Outlays	4	9	11	13	15
Reporting Requirements:					
Estimated Authorization Level	1	0	0	0	0
Estimated Outlays	1	0	0	0	0
Total Changes:					
Estimated Authorization Level	38	54	71	86	99
Estimated Outlays	17	39	57	74	89

Basis of estimate: For this estimate, CBO assumes that H.R. 2774 will be enacted near the end of fiscal year 2007 and that the entire amounts authorized and estimated to be necessary will be appropriated for each fiscal year. Estimated outlays are based on historical spending patterns for DOE energy supply and conservation programs.

H.R. 2774 would authorize the appropriation of $37 million in 2008 and $347 million over the 2008–2012 period for DOE solar energy programs. CBO estimates that appropriation of those amounts, plus an additional $1 million for new reporting requirements, would result in discretionary outlays of $17 million in fiscal year 2008 and $276 million over the 2008–2012 period.

Grant and demonstration programs

H.R. 2774 would create three DOE grant and demonstration programs. The bill would specifically authorize the following appropriations:

- Between $17 million and $70 million a year to states to distribute grants to commercial, governmental, and residential users of electricity to purchase photovoltaic technology;
- $10 million annually for grants to develop and strengthen a school curriculum and workforce training programs concerning the use of solar energy products; and
- $3 million annually for a demonstration program of solar-powered air-conditioning technology.

CBO estimates that appropriation of the authorized amounts would cost $12 million in 2008 and $223 million over the 2008–2012 period.

Thermal energy storage and solar energy research and development

H.R. 2774 would authorize the appropriation of $63 million over the 2008–2012 period for research grants to study thermal energy and solar power. Specifically, the bill would authorize the appropriation of between $5 million and $12 million annually for the development of lower-cost thermal energy storage technologies. Under the bill, another $4 million a year would be authorized to be appropriated to promote the commercial application of solar energy, with a portion of those funds allocated for an annual report assessing the energy savings resulting from solar energy use. Assuming appropriation of the authorized amounts, CBS estimates that implementing those provisions would cost $4 million in 2008 and $52 million over the 2008–2012 period.

Reporting requirements

CBO estimates that about $1 million would be necessary in 2008 to prepare two studies required by the bill. The first study would analyze methods to transmit concentrated solar power to regional electricity transmission systems. The second study would address how to reduce the amount of water consumed by solar power systems.

Intergovernmental and private-sector impact: H.R. 2774 contains no intergovernmental or private-sector mandates as defined in UMRA and would create several research and grant programs benefiting state and local governments. Any costs those governments might incur, including matching funds, would be incurred voluntarily.

Estimate prepared by: Federal Costs: Leigh Angers; Impact on State, Local, and Tribal Governments: Neil Hood; Impact on the Private Sector: Craig Cammarata.

Estimate approved by: Peter H. Fontaine, Deputy Assistant Director for Budget Analysis.

XI. Compliance With Public Law 104–4

H.R. 2774 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. 2774 is to advance solar energy technologies by establishing research and development programs in thermal energy storage and solar air conditioning, a program to support the commercial application of direct solar lighting technology, a nationwide solar demonstration program, a solar energy curriculum development and certification program, and by conducting two concentrating solar power commercial application studies.

XIV. Constitutional Authority Statement

Article I, section 8 of the Constitution of the United States grants Congress the authority to enact H.R. 2774.

XV. Federal Advisory Committee Statement

H.R. 2774 does not establish nor authorize the establishment of any advisory committee.

XVI. Congressional Accountability Act

The Committee finds that H.R. 2774 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. 2774 does not contain any congressional earmarks, limited tax benefits, or limited tariff benefits as defined in clause 9(d), 9(e), or 9(t) 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. Changes in Existing Law Made by the Bill, As Reported

The bill does not change existing law.

XX. Committee Recommendations

On June 27, 2007, the Committee on Science and Technology favorably reported H.R. 2774, as amended, by a voice vote and recommended its enactment.

XXI: PROCEEDINGS OF THE MARKUP BY THE SUBCOMMITTEE ON ENERGY AND ENVIRONMENT ON H.R. 2774, THE SOLAR ENERGY RESEARCH AND ADVANCEMENT ACT OF 2007

THURSDAY, JUNE 21, 2007

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

The Subcommittee met, pursuant to call, at 2:10 p.m., in Room 2318 of the Rayburn House Office Building, Hon. Nick Lampson [Chairman of the Subcommittee] presiding.

Chairman LAMPSON. The Subcommittee on Energy and Environment will come to order. Pursuant to notice, the Subcommittee on Energy and Environment meets to consider the following measures: H.R. 1933, the *Department of Energy Carbon Capture and Storage Research, Development and Demonstration Act of 2007;* H.R. 2774, the *Solar Energy Research and Advancement Act of 2007;* and H.R. 2773, the *Biofuels Research and Development Enhancement Act.*

We will now proceed with the markup beginning with opening statements, and I will begin.

Energy is not something most Americans have thought about since the oil embargo of the 1970s. Gas and electricity were cheap, environmental issues were not a concern and we did not appreciate our increased vulnerability to unstable foreign energy supplies. Consequently, energy stayed out of the legislative spotlight for many years.

The Congress passed significant energy legislation in 2005 in response to rising fuel prices and increased concerns about energy security. Since then the growing public awareness and acceptance of climate change compels us to take further actions on energy. Today this committee is taking yet another step to increase federal investment in energy technologies that we know will lessen the environmental impact of our energy use, decrease our reliance on foreign fuels and still maintain the quality of life we enjoy today.

First on the agenda is H.R. 1933 by Representative Udall which sets out the next steps in DOE's carbon mitigation strategies. In addition to continuing the Department's research on carbon dioxide management, the bill authorizes large-scale demonstrations of carbon sequestration technologies through partnerships with indus-

trial, academic and government entities. An amendment by Mr. Udall will add demonstrations of carbon capture technology as well. Because we will continue to use our abundant resources of coal to meet our energy needs for the foreseeable future, it is critical that we demonstrate an integrated system of capture, transportation and storage of carbon dioxide at a large scale.

Next we will take H.R. 2774, the *Solar Energy and Advancement Act of 2007,* introduced by Congresswoman Giffords. This bill creates a research and development program on energy storage technology for concentrating solar power plants which allows for the use of solar energy even when the sun isn't shining. It also asks the DOE to conduct studies on how best to integrate concentrating solar plants with the grid and ways to reduce water usage in these plants. I know the Congresswoman also plans to introduce an amendment today that creates a solar workforce program, and this will further improve the bill and I look forward to hearing what my distinguished colleague has to say about it soon.

And finally, the Subcommittee will consider my bill, H.R. 2773, the *Biofuels Research and Development Enhancement Act.* This bill attempts to better coordinate and compile information from federal biofuels research programs, focus some of the biofuels research on infrastructure needs and efficiency of biorefinery technologies, study some of the continuing challenges facing broader use of biofuels, and increase the funding levels for biofuels research.

For each of these bills, the Subcommittee has held hearings examining the various technical barriers and possible pathways for these technologies. Many of the amendments that will be offered today result from the advice and input provided by the witnesses at these hearings. Today the Subcommittee should report meaningful legislation that will bring us one step closer to their consideration on the House Floor in July. I urge support for all of these bills and I look forward to working with all of you as we move these bills forward to Full Committee next week.

[The prepared statement of Chairman Lampson follows:]

PREPARED STATEMENT OF CHAIRMAN NICK LAMPSON

Energy is not something most Americans have thought about since the oil embargo in the 1970's. Gas and electricity were cheap, environmental issues were not a concern, and we did not appreciate our increased vulnerability to unstable foreign energy supplies. Consequently "Energy" stayed out of the legislative spotlight for many years.

The Congress passed significant energy legislation in 2005 in response to rising fuel prices and increased concerns about energy security. Since then, the growing public awareness and acceptance of climate change compels us to take further actions on energy. Today this committee is taking yet another step to increase federal investment in energy technologies that we know will lessen the environmental impact of our energy use, decrease our reliance on foreign fuels, and still maintain the quality of life we enjoy today.

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An amendment by Mr. Udall will add demonstrations of carbon capture technology as well. Because we will continue to use our abundant resources of coal to meet our energy needs for the foreseeable future, it is critical that we demonstrate an INTEGRATED system of capture, transportation, and storage of carbon dioxide at a large scale.

Next we will take up H.R. 2774, the *Solar Energy Research and Advancement Act of 2007,* introduced by Congresswoman Giffords. This bill creates an R&D program on energy storage technology for concentrating solar power plants, which allows for the use of solar energy even when the sun isn't shining.

It also asks the DOE to conduct studies on how to best integrate concentrating solar plants with the grid, and ways to reduce water usage in these plants. I know the Congresswoman also plans to introduce an amendment today that creates a solar workforce program. This will further improve the bill, and I look forward to hearing what my distinguished colleague has to say about it soon.

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Chairman LAMPSON. I now recognize Mr. Inglis, the Ranking Member, to present his opening remarks.

Mr. INGLIS. Thank you, Mr. Chairman, and I look forward to this markup.

The bills we mark up today are reflections of the commitment we have made to move away from our dependence on foreign oil and toward solutions that make both economic and environmental sense.

Renewable energy sources give us the opportunity to end our dependence on fossil fuels like oil and coal. In the meantime though, we will use a lot of oil and a lot of coal. That is why we must work to make sure especially that our coal consumption is as emission-free and energy efficient as possible, bringing benefits to both industry and to the environment.

Carbon capture and storage technologies hold significant promise for reducing carbon emissions. H.R. 1933, the *Department of Energy Carbon Capture and Storage Research, Development and Demonstration Act,* will fund demonstration projects that integrate these technologies. The aim is that the research and experience gained from these projects will help bring down the cost of implementing carbon-reducing technologies in the private sector.

As I mentioned earlier, the ultimate goal is energy sources that are renewable and emission-free. H.R. 2774, the *Solar Research and Advancement Act,* and H.R. 2773, the *Biofuels Research and Development Act,* are two steps in that direction. Biofuels and solar energy should be sources of energy for us, and I am looking forward to promoting research programs that will make these alternatives commercially viable.

Thank you again, Mr. Chairman, and I look forward to working with you to advance these pieces of legislation.

[The prepared statement of Mr. Inglis follows:]

PREPARED STATEMENT OF REPRESENTATIVE BOB INGLIS

Thank you for holding this markup, Mr. Chairman.

The bills we're marking up today are reflections of the commitment we have made to move away from our dependence on foreign oil, and toward solutions that make both economic and environmental sense.

Renewable energy sources give us the opportunity to end our dependence on fossil fuels like oil and coal. In the meantime we'll use lots of coal. That's why we must work to make sure that our coal consumption is as emission-free and energy efficient as possible, bringing benefits to both industry and the environment.

Carbon capture and storage technologies hold significant promise for reducing carbon emissions. H.R. 1933, the *Department of Energy Carbon Capture and Storage Research, Development, and Demonstration Act,* will fund demonstration projects that integrate these technologies. The aim is that the research and experience gained from these projects will help bring down the cost of implementing carbon-reducing technologies in the private sector.

As I mentioned earlier, the ultimate goal is energy sources that are renewable and emission-free. H.R. 2774, the *Solar Research and Advancement Act,* and H.R. 2773, the *Biofuels Research and Development Act,* are two steps in that direction. Biofuels and solar energy should be sources of energy for us, and I'm looking forward to promoting research programs that will make these alternatives commercially viable.

Thank you again, Mr. Chairman, and I look forward to working with you to advance this legislation.

Chairman LAMPSON. Thank you, Mr. Inglis.

Without objection, Members may place statements in the record at this point.

We will now consider H.R. 2774, the *Solar Energy Research and Advancement Act of 2007,* and I yield Ms. Giffords five minutes to describe this bill.

Ms. GIFFORDS. I want to thank Chairman Lampson and Ranking Member Inglis for considering H.R. 2774, the *Solar Energy Research and Advancement Act,* in Subcommittee this afternoon.

On Tuesday, we had an opportunity to hear from a very distinguished group of witnesses including the Director of the National Renewable Energy Lab, NREL, the President of the Solar Energy Industries Association, SEIA, and the solar technology coordinator for Arizona Public Service, APS, which is now the fastest or the second fasting growing electric utility in the United States over the last five years. Many Members of the Subcommittee attended the hearing and I believe that we had a very informative and engaging dialogue on the discussion draft of this legislation.

The bill before us today contains two main components that will move research and development forward on concentrating solar power. The first would establish a Thermal Energy Storage Research and Development Program within the Department of Energy. This will help us solve perhaps the most significant problem with concentrating solar power technology: energy storage. We need more advanced technologies so that we can store solar energy when the sun shines and use it at night or on cloudy days. This is critical for energy reliability and viability. In giving strong support for this research at the hearing, Dr. Dan Arvizu from NREL said that the ability for Concentrating Solar Power (CSP) technologies to store energy presents an opportunity to produce baseload power at about five cents per kilowatt-hour. Such systems would include 13 to 17 hours of thermal storage and would compete with the cost of power from coal plants using carbon sequestration technology. It is expected that an aggressive R&D program could achieve this cost goal by 2020.

The second component would require the Department of Energy to conduct two concentrating solar power commercial application studies. One study would look at methods to integrate concentrating solar power energy into regional electricity transmission

systems. The best time of the day to produce and use solar energy is from 10 a.m. to 5 p.m. We need to research how to connect major solar power plants to the electric grid, relieve expensive demand on electric utilities and use solar energy during these peak hours, but we also need to figure how to bring this abundant resource from the Southwest and sunny areas to the entire country.

The other part would require DOE to examine methods to reduce the amount of water consumed by concentrating solar power systems. Given the strains of water resources in the Southwest, we must study the subject so that we can realize the full benefits of this technology.

In addition to the initiatives I have just laid out, I will also offer an amendment today, and as I said on Tuesday, solar power is not a partisan issue. The sun beats down on Democrats on Republicans and Independents alike with equal intensity, and I know that this bill is going to help us really harness the power of the sun. So I look forward to the Members' support of this legislation and I will continue to work with all of you as we move forward in this committee.

Chairman LAMPSON. Thank you very much. I recognize Mr. Inglis for any remarks.

Mr. INGLIS. Thank you, Mr. Chairman. I have no questions and hope that we can move rapidly.

Chairman LAMPSON. Does anyone else wish to be recognized?

I ask unanimous consent that the bill is considered as read and open to amendment at any point and that 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 gentlelady from Arizona. Ms. Giffords, are you ready to proceed with your amendment?

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

Chairman LAMPSON. The Clerk will report the amendment.

The CLERK. Amendment to H.R. 2774 offered by Ms. Giffords of Arizona.

Chairman LAMPSON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize Ms. Giffords for five minutes to explain the amendment.

Ms. GIFFORDS. Thank you, Mr. Chairman. My amendment will establish a competitive grant program to create and strengthen solar industry training and internship programs across the country. This will ensure that workers obtain the necessary skills to install, operate and maintain solar energy products. The need for this program is clear. The solar energy industry is growing at a very fast pace and we need to ensure that we have a skilled workforce to sustain this growth. A strong solar industry will stimulate business development, create new jobs, help protect our environment and promote energy independence. This amendment requires DOE to ensure sufficient geographic distribution of training programs nationally and to ensure quality control, grants will only be awarded for certified training programs or new and growing programs with a credible path toward certification.

At Tuesday's hearing, we heard testimony supporting this legislation from Ms. Jane Weissman, Executive Director of the Interstate Renewable Energy Council and Vice Chair of the North American Board of Certified Energy Practitioners as well as from Joseph Sarubbi, Professor and Chair of the Building Systems Technology Department at Hudson Valley Community College. Ms. Weissman expressed support for this workforce development training by stating that current training opportunities fall far short of the demand expected for qualified workers. We need more classroom and hands-on training tailored to meet local labor needs. She also noted that training needs need to be based on industry standards so that students are taught the right skills with the right equipment.

This amendment will help us achieve two important goals: one, expanding the market for solar energy products by creating a trained, reliable workforce that can install and maintain solar equipment for wider use in commercial and residential settings; and number two, train people for good-paying jobs right here at home.

I look forward to Member support for this important addition to the *Solar Energy Research and Advancement Act.*

Chairman LAMPSON. Thank you, Ms. Giffords.

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

Are there any amendments? Hearing none, and pursuant to Rule 2T, further proceedings on this matter are postponed until further notice from the Chair.

There is unfinished business on H.R. 2774. Are there other amendments to H.R. 2774? Other amendments? Hearing none, the vote is on the bill, H.R. 2774, the *Solar Energy Research and Advancement Act of 2007,* as amended. All those in favor will say aye. Those opposed will say no. In the opinion of the Chair, the ayes have it.

I recognize Ms. Woolsey for a motion.

Ms. WOOLSEY. Mr. Chairman, I move that the Subcommittee favorably report H.R. 2774 as amended to the Full Committee. Furthermore, I move that the staff be instructed to prepare the Subcommittee legislative report and make necessary technical and conforming changes to the bill as amended in accordance with the recommendations of the Subcommittee.

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

Without objection the motion to reconsider is laid upon the table. Subcommittee Members may submit additional and Minority views on the measure.

I want to thank the Members for their attendance, and this concludes our Subcommittee markup. We stand adjourned.

[Whereupon, at 4:10 p.m., the Subcommittee was adjourned.]

Appendix:

H.R. 2774, Section-by-Section Analysis, Amendment Roster

110TH
CONGRESS
1ST SESSION

H. R. __

To support the research, development, and commercial application of solar energy technologies, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

Ms. GIFFORDS introduced the following bill; which was referred to the Committee on _____

A BILL

To support the research, development, and commercial application of solar energy technologies, 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 "Solar Energy Research and Advancement Act of 2007".

SEC. 2. DEFINITIONS.

For purposes of this Act:

(1) The term "Department" means the Department of Energy.

(2) The term "Secretary" means the Secretary of Energy.

SEC. 3. THERMAL ENERGY STORAGE RESEARCH AND DEVELOPMENT PROGRAM.

(a) ESTABLISHMENT.-- The Secretary shall establish a program of research and development to provide lower cost and more viable thermal energy storage technologies to enable the shifting of electric power loads on demand and extend the operating time of concentrating solar power electric generating plants.

(b) AUTHORIZATION OF APPROPRIATIONS.-- There are authorized to be appropriated to the Secretary for carrying out this section $5,000,000 for fiscal year 2008, $7,000,000 for fiscal year 2009, $9,000,000 for fiscal year 2010, $10,000,000 for fiscal year 2011, and $12,000,000 for fiscal year 2012.

SEC. 4. CONCENTRATING SOLAR POWER COMMERCIAL APPLICATION STUDIES.

(a) INTEGRATION.-- The Secretary shall conduct a study on methods to integrate concentrating solar power into regional electricity transmission systems, and to identify new transmission or transmission upgrades needed to bring electricity from high concentrating solar power resource areas to growing electric power load centers throughout the United States. The study shall analyze and assess approaches for management and integration of concentrating solar power into regional electric transmission grids to improve electric reliability, to efficiently manage load, and to reduce demand on the natural gas transmission system for electric power. The Secretary shall submit a report to Congress on the results of this study not later than 12 months after the date of enactment of this Act.

(b) WATER CONSUMPTION.-- Not later than 6 months after the date of the enactment of this Act, the Secretary of Energy shall transmit to Congress a report on the results of a study on methods to reduce the amount of water consumed by concentrating solar power systems.

SECTION-BY-SECTION ANALYSIS OF H.R. 2774, THE SOLAR ENERGY RESEARCH AND ADVANCEMENT ACT OF 2007

Bill Summary

The bill directs the Secretary to establish a research and development program on thermal energy storage technologies for concentrating solar power (CSP), and conduct two CSP studies. One study will determine the necessary steps to integrate CSP plants with the regional and national electric grid, and the other will examine ways to reduce water usage in CSP plants.

Section 1. Short Title

Act may be cited as the "Solar Energy Research and Advancement Act of 2007".

Section 2. Definitions

Provides definitions for the following terms used in the Act: 'Department' and 'Secretary'.

Section 3. Thermal Energy Storage Research and Development Program

Section 3(a) instructs the Secretary to establish a research and development program on thermal energy storage technologies for concentrating solar power. Section 3(b) authorizes appropriations of $5,000,0000 in fiscal year 2008, $7,000,0000 in fiscal year 2009, $9,000,0000 in fiscal year 2010, $10,500,0000 in fiscal year 2011, and $12,000,0000 in fiscal year 2012.

Section 4. Concentrating Solar Power Commercial Application Studies

Section 4(a) instructs the Secretary to conduct a study that will determine the necessary steps to integrate concentrating solar power plants with the regional and national electric grid. Results of shall be submitted to Congress no later than 12 months after the date of enactment of this Act. Section 4(b) instructs the Secretary to conduct a study on methods to reduce the amount of water consumed by concentrating solar power plants. Results of shall be submitted to Congress no later than six months after the date of enactment of this Act.

COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT
SUBCOMMITTEE MARKUP
June 21, 2007

H.R. 2774 – *the Solar Energy Research and Advancement Act of 2007*

AMENDMENT ROSTER

No.	Sponsor	Description	Results
1	Ms. Giffords	Adds a new section establishing a competitive grant program through the Department of Energy to create and strengthen workforce training programs on installation and maintenance of solar energy materials.	Agreed to by voice vote.

AMENDMENT TO H.R. 2774

OFFERED BY MS. GIFFORDS OF ARIZONA

At the end of the bill, add the following new section:

1 **SEC. 5. SOLAR ENERGY CURRICULUM DEVELOPMENT AND**
2 **CERTIFICATION GRANTS.**

3 (a) ESTABLISHMENT.—The Secretary shall establish
4 in the Office of Solar Energy Technologies a competitive
5 grant program to create and strengthen solar industry
6 workforce training and internship programs in installa-
7 tion, operation, and maintenance of solar energy products.
8 The goal of this program is to ensure a supply of well-
9 trained individuals to support the expansion of the solar
10 energy industry.

11 (b) AUTHORIZED ACTIVITIES.—Grant funds may be
12 used to support the following activities:

13 (1) Creation and development of a solar energy
14 curriculum appropriate for the local educational, en-
15 trepreneurial, and environmental conditions.

16 (2) Support of certification programs, such as
17 the North American Board of Certified Energy
18 Practitioners, for individual solar energy system in-
19 stallers, instructors, and training programs.

(3) Internship programs that provide hands-on participation by students in commercial applications.

(4) Activities required to obtain certification of training programs and facilities by the Institute of Sustainable Power or an equivalent industry-accepted quality-control certification program.

(5) Incorporation of solar-specific learning modules into traditional occupational training and internship programs for construction-related trades.

(6) The purchase of equipment necessary to carry out activities under this section.

(7) Support of programs that provide guidance and updates to solar energy curriculum instructors.

(c) ADMINISTRATION OF GRANTS.—Grants may be awarded under this section for up to 3 years. The Secretary shall award grants to ensure sufficient geographic distribution of training programs nationally. Grants shall only be awarded for programs certified by the Institute of Sustainable Power or an equivalent industry-accepted quality-control certification institution, or for new and growing programs with a credible path to certification.

(d) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary for carrying out this section $10,000,000 for each of the fiscal years 2008 through 2012.

XXII: PROCEEDINGS OF THE FULL COMMITTEE MARKUP ON H.R. 2774, THE SOLAR ENERGY RESEARCH AND ADVANCEMENT ACT OF 2007

WEDNESDAY, JUNE 27, 2007

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

The Committee met, pursuant to call, at 10:08 a.m., in Room 2318 of the Rayburn House Office Building, Hon. Bart Gordon [Chairman of the Committee] presiding.

Chairman GORDON. The Committee will come to order.

Pursuant to notice, the Committee on Science and Technology meets to consider the following measures: H.R. 906, the *Global Change Research and Data Management Act of 2007;* H.R. 1933, the *Department of Energy Carbon Capture and Storage Research, Development, and Demonstration Act of 2007;* H.R. 2773, the *Biofuels Research and Development Enhancement Act;* and H.R. 2774, the *Solar Energy Research and Investment Act of 2007.*

I know that we have a lot of other markups going on today, so we are going to try to proceed, but I would like to make a couple of announcements at first. Now, some of the Members have been interested in the trip we are going to be taking, the fact-finding trip we are taking to Greenland the weekend of July the 19th. We should know today about—we have a plane, but we still have concern about in-country travel, because we can't use our plane there, because of the lengths of the runway. We should know more about that today, so we will know the size and the number of folks that we can take.

Also, you have received a letter through your office, but I will remind you, in case you didn't know, that there is going to be a climate change meeting of the UN Framework Convention on Climate Change, the parent body that oversees the Kyoto Protocol. It will be held in Bali from December the 3rd to the 14th. There will be important areas of discussion. It will include carbon sequestration, reforestation, avoiding deforestation, and carbon trading. There will be about 10,000 international delegates there. We will not, or as Members, we will not be a credentialed participant, but we will be able to interact with those folks that are there. We will not be taking a Science Committee group as a whole, but we do have some slots, I think, that will be made available to us, for individuals that would like to go. But again, when you put 10,000 people there, it is going to be crowded, and so, you need to let us know soon.

And finally, I think that we should all say happy birthday to Margaret today. We congratulate her on surviving one more, and hope there will be more to come.

Mr. LAMPSON. And happy anniversary to you and your wife, Mr. Chairman.

Chairman GORDON. Thank you for reminding me. By the way, from 7:00 to 9:00 will be a good time to call votes, because I am not going to be here tonight.

With concern about global climate change, the high gas and electricity prices, and our growing reliance on unstable energy supplying nations, energy has come to the forefront of our constituents' awareness, and has been placed at the top of the Congressional to-do list. Here, on the Science and Technology Committee, we have responded with an aggressive energy agenda. With the addition of four bills, that we are going to mark up today, this committee will contribute an even dozen pieces of bipartisan legislation that made a vital contribution to the national strategy to put U.S. and the world on track to a more sustainable future.

First, we will consider H.R. 906. Mr. Udall and Mr. Inglis, the Ranking Member of the Energy and Environment Subcommittee and co-sponsor of the bill, have worked together to produce this legislation. H.R. 906 re-orients the U.S. Global Change Research Program to produce more policy relevant climate information for regional, State, and local governments, and other groups.

We will then take up H.R. 1933, by Representative Udall, which sets out the next steps in DOE's carbon mitigation strategies. In addition to ongoing research in carbon management, the bill authorizes DOE to conduct demonstrations on large scale Carbon Capture and Storage technologies, through partnerships with industrial, academic, and government entities. Because we will continue to use our abundant resources of coal to meet our energy needs for the foreseeable future, it is critical that we demonstrate an integrated system of capture, transportation, and storage of carbon dioxide, at a scale that encourages industry to start making technological choices.

Next, the Committee will take up a bill by the Chairman of the Energy and Environment Subcommittee, Representative Nick Lampson. H.R. 2773, the *Biofuels Research and Development Enhancement Act,* will better coordinate and compile information from federal biofuels research programs, and focus biofuels research on infrastructure needs and efficiency of biorefinery technologies. H.R. 2773 also provides for the in depth study of several challenges facing broader of biofuels, and increases the funding levels of biofuels research.

Finally, we will consider H.R. 2774, the *Solar Energy Research and Advancement Act of 2007,* introduced by Congresswoman Giffords. This bill creates an R&D program on energy storage technology for concentrating solar plants, which allows for the use of solar energy, even when the sun isn't shining. It also asks DOE to conduct studies on how to best integrate concentrating solar plants within the grid, and ways to reduce water uses in these plants. In addition, it creates a workforce training program for solar installation and maintenance, which is critical to making solar power a real energy option across the Nation.

For each of these bills, the Energy and Environment Subcommittee held legislative hearings, had markups, where we heard valuable witness testimony, and facilitated good Member discussions on the barriers and possible pathways to these programs. And as you know, we are not alone in this effort. The Energy and Commerce Committee is marking up a series of bills today, at this very moment, and my friend, Congressman Hall, as well as a few of the folks in the Majority, are on both committees, so we are monitoring that, and if you see a dust cloud here at some point, we will be moving to the other committee to make those votes, but I am sure we will be left in good hands here, and we will continue with this markup.

In conclusion, I want to urge my colleagues to support these bills. I know that the Committee's pace has been very aggressive, and it has been difficult at times for all of us. However, I believe the products that have resulted from this process demonstrate the value of this committee, and its bipartisan work reflects the entire membership.

The bottom line is that we are going to have an energy bill in July. The Science Committee is going to, in a bipartisan way, make a major, major contribution with that. There are going to be several other committees that will have bills. We are going to get a reference from most of those, sequential, which we will also put our mark on. Every bill that has come out of this committee has been bipartisan, all but one. We will see what happens today, but so far, all but one has been unanimous, and so, I think everyone on this committee can go home, and claim a great deal of credit for what I think will be not an enormously comprehensive, but a good bill, a step forward, that will pass by a large margin on the House Floor in July.

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

[The prepared statement of Chairman Gordon follows:]

PREPARED STATEMENT OF CHAIRMAN BART GORDON

With concerns about global climate change, high gas and electricity prices, and our growing reliance on unstable energy-supplying nations, energy has come to the forefront of our constituents' awareness and has been placed at the top of the Congressional "To-Do" list.

Here on the Science and Technology Committee we have responded with an aggressive energy agenda.

With the addition of the four bills we are marking up today, this committee will contribute an even dozen pieces of legislation that make a vital contribution to the national strategy to put the U.S., and the world, on track to a more sustainable future.

First we will consider H.R. 906. Mr. Udall and Mr. Inglis, the Ranking Member of the Energy and Environment Subcommittee and co-sponsor of the bill, have worked together to produce this legislation.

H.R. 906 re-orients the U.S. Global Change Research Program to produce more policy-relevant climate information for regional, State, and local governments and other user groups.

We will then take up H.R. 1933 by Rep. Udall, which sets out the next steps in DOE's carbon mitigation strategies. In addition to ongoing research in carbon management, the bill authorizes DOE to conduct demonstrations of large-scale carbon capture and storage technologies through partnerships with industrial, academic and government entities.

Because we will continue to use our abundant resources of coal to meet our energy needs for the foreseeable future, it is critical that we demonstrate an integrated system of capture, transportation, and storage of carbon dioxide at a scale that encourages industry to start making technology choices.

Next, the Committee will take up a bill by the Chairman of the Energy & Environment Subcommittee, Rep. Nick Lampson. H.R. 2773, the *Biofuels Research and Development Enhancement Act,* will better coordinate and compile information from federal biofuels research programs and focus biofuels research on infrastructure needs and efficiency of biorefinery technologies.

H.R. 2773 also provides for the in-depth study of several challenges facing broader use of biofuels and increases the funding levels for biofuels research.

Finally, we will consider H.R. 2774, the *Solar Energy Research and Advancement Act of 2007,* introduced by Congresswoman Giffords. This bill creates an R&D program on energy storage technology for concentrating solar power plants, which allows for the use of solar energy even when the sun isn't shining.

It also asks DOE to conduct studies on how to best integrate concentrating solar plants with the grid, and ways to reduce water usage in these plants. In addition, it creates a workforce training program for solar installation and maintenance, which is critical to making solar power a real energy option across the country.

For each of these bills the Energy and Environment Subcommittee held legislative hearings and markups where we heard valuable witness testimony and facilitated good Member discussions on the barriers and possible pathways for these programs.

And, as you all may know, we are not alone in this effort today. The Energy and Commerce Committee is also marking up a series of energy bills and I, along with Ranking Member Hall and a few others, may have to excuse myself for votes in that committee.

In conclusion, I urge my colleagues to support these four bills. I know the Committee's pace has been very aggressive and that has been difficult at times for all of us. However, I believe the products that have resulted from this process demonstrate the value of this committee and its work and it reflects well on the entire membership.

I want to thank all the Members for their cooperation and participation.

Mr. HALL. Thank you, Mr. Chairman, and I will try not to take the full length of time, and make one statement. I will be glad, as I am sure you will and others, when this month passes.

I understand that you and your fellow Chairman and other Members have been working, I guess, under the usual pressure of this first year, to get and report bills out of the Committee, and sometimes, I fear that when we rush things through, we don't get the best end product we could have, if we had more time to fully vet the language, but I guess we will be working that as we go.

You have done a good job of working with us, and I thank you for that. While I think improvements in the bill before us today are going to occur through amendments to be offered, I think they could be improved further, and I hope we will have other opportunities to do this, as the bill moves to the Floor. It is also my hope and understanding that, going forward, there will be more of an effort to have both sides working together, as we craft legislation to come before this committee. We will have more time. I think this would improve not only the quality of work we produce, but also, the bipartisan way in which they are handled.

With that said, I support and believe it is important to our country's energy future to keep all options on the table, and we strive to do that with the three energy bills before us. One of our greatest challenges as a Nation is energy self-sufficiency. We need to break our dependence on foreign sources of energy from countries we don't trust and who don't trust us. To do that, we need to be honest and practical about what needs to be done to get to that point.

Solar and biofuels are an important source of domestic energy, but they are also limited in their scope. It is important that we continue to research and develop the resources we know exist domestically, and currently provide reliable, affordable, and clean sources of energy. I look forward to working with the Committee

and working with you, Mr. Chairman, in the months ahead, to address this reality, so that Americans can enjoy more energy choices at a lower cost.

I yield back.

[The statement of Mr. Hall follows:]

PREPARED STATEMENT OF REPRESENTATIVE RALPH M. HALL

Thank you Mr. Chairman. In the interest of time, I will keep my statement brief and say that I will be glad when this month is over. I understand that you and your fellow Chairmen have been working under pressure from the Speaker to report bills out of committee, but I fear that sometimes when things are rushed through, we don't get the best end-products we could have if we had more time to fully vet the language. While I think there are improvements in the bills before us today with the Subcommittee markup last week and the amendments to be offered today, I think that they could still be improved upon, and I hope that we'll have other opportunities to do so. It is also my hope and understanding that going forward, there will be more of an effort to have both sides working together as we craft legislation to come before the Committee. I think this would improve not only the quality of work we produce, but also the bipartisan way in which they are handled.

With that said, I support what we're doing here today. It's important to our country's energy future to keep all options on table, and we continue to do that with the three energy bills before us.

With that I yield back the balance of my time.

Chairman GORDON. Thank you, Mr. Chairman, or rather, thank you, Mr. Hall.

Let me also say that you may not know, but I met privately and personally with the Republican, both the staff from the Members, as well as the Committee staff the other day, to talk about how we can, you know, do what I think is a good job even better. There were compliments in some areas of the consultation. There were suggestions for improvement in the others. I have asked for them to put together models of how they see things done, and good ways that we have done it, and if we haven't done it as well as we would like, so those kind of models, we are going to continue to work together.

I am a new Chairman, there is a lot of new staff, and we are going to get this thing better and better, as we go along, because I truly believe that more consultation gets us a bipartisan bill, a consensus bill, and we are all going to be better off.

So, does anyone else wish to be recognized?

We now consider H.R. 2774, the *Solar Energy Research and Advancement Act of 2007.* I yield to the gentlelady from Arizona five minutes to describe the bill.

Ms. GIFFORDS. Well, first of all, I want to thank Chairman Gordon and Ranking Member Hall for considering H.R. 2774, the *Solar Energy Research and Advancement Act,* in the Full Committee this morning. I also want to thank my fantastic staff, the staff of the Science Committee, for all of your help in making this possible.

Mr. Chairman, today is a bright day indeed, no pun intended. Last week, we had the opportunity to hear from a very distinguished panel of witnesses, including the Director of the National Renewable Energy Laboratory, NREL, the President of the Solar Energy Industries Association, SEIA, and the Solar Technology Coordinator for Arizona Public Service, which is the second fastest growing electric utility in the United States over the last five years. Many Members of the Energy and Environment Subcommittee at-

tended the hearing, and I think we had an incredibly interesting and informing dialogue on the discussion draft for this legislation.

The bill before us today contains three major components, two of which will move research and development forward on Concentrating Solar Power, CSP. The first would establish a Thermal Energy Storage Research and Development Program within the Department of Energy. This will help us, Mr. Chairman, solve perhaps the most significant problem with Concentrating Solar Power, which is the energy storage issue. We need more advanced technology, so that we can store solar energy when the sun rises, and use it at night, or on cloudy days. This is critical for energy reliability and viability.

The second component, Mr. Chairman, would require the Department of Energy to conduct two Concentrating Solar Power Commercial Application Studies, the first of which would study methods to integrate concentrating solar power energy into regional electricity transmission systems. We need to research how to connect major solar power plants to the electric grid, relieve expensive demand on electric utilities, and use solar energy during these peak hours. We also need to figure out how to bring this abundant resource from the Southwest and other very warm, sunny areas, to the entire country.

The second report would require the Department of Energy to examine methods to reduce the amount of water consumed by concentrating solar power systems. Given the strain on water resources, the drought, for example, in the Southwest, we must study this subject, so that we can fully realize the benefits and the possibilities of CSP technology.

The bill's third component establishes a competitive grant program to create and to strengthen solar industry training and internship programs across the country. This will ensure that workers obtain the necessary skills to install, operate, and maintain solar energy products.

The need for this program is clear.

The solar industry is growing at a very fast clip, and we need to make sure that we have the skilled workforce in order to sustain this growth.

A strong solar industry will stimulate business development, create new jobs, help protect the environment, and promote the energy independence which we all understand to be so important.

In addition to what I have introduced here, Mr. Chairman, I look forward to supporting several very good bipartisan amendments that will make this bill a much better bill.

As I said last week, solar energy is a nonpartisan issue, and I know that we can all benefit from harnessing the power from the sun.

I look forward to the Members' support for H.R. 2774, and I will continue to work with all of you as we move to the Floor, hopefully next week.

[The prepared statement of Ms. Giffords follows:]

PREPARED STATEMENT OF REPRESENTATIVE GABRIELLE GIFFORDS

I want to thank Chairman Gordon and Ranking Member Hall for considering H.R. 2774, the *Solar Energy Research and Advancement Act,* in the Full Committee this morning.

Last week, we had the opportunity to hear from a very distinguished panel of witnesses, including the Director of the National Renewable Energy Laboratory (NREL), the President of the Solar Energy Industries Association (SEIA), and the Solar Technology Coordinator for Arizona Public Service (APS), which is the second fastest growing electric utility in the U.S. over the last five years.

Many Members of the Energy and Environment Subcommittee attended the hearing, and we had a very informative and engaging dialogue on the discussion draft for this legislation.

The bill before us today contains three main components, two of which will move research and development forward on concentrating solar power (CSP).

The first would establish a "Thermal Energy Storage Research and Development Program" within the Department of Energy. This will help us solve perhaps the most significant problem with concentrating solar power technology: energy storage. We need more advanced technology so that we can store solar energy when the sun shines and use it at night or on a cloudy day. This is all critical for energy reliability and viability.

The second component would require DOE to conduct two "Concentrating Solar Power Commercial Application Studies." One would study methods to integrate concentrating solar power energy into regional electricity transmission systems. We need to research how to connect major solar power plants to the electric grid, relieve expensive demand on electric utilities, and use solar energy during these peak hours. We also need to figure out how to bring this abundant resource from the Southwest to the entire country.

The other report would require DOE to examine methods to reduce the amount of water consumed by concentrating solar power systems. Given the strain on water resources in the Southwest, we must study this subject so we can realize the full benefits of CSP technology.

The bill's third component establishes a competitive grant program to create and strengthen solar industry training and internship programs across the country. This will ensure that workers obtain the necessary skills to install, operate, and maintain solar energy products.

The need for this program is clear.

The solar energy industry is growing at a very fast pace, and we need to ensure that we have a skilled workforce to sustain this growth.

A strong solar industry will stimulate business development, create new jobs, help protect our environment, and promote energy independence.

In addition to what I've introduced here, I also look forward to supporting several amendments from both sides of the aisle that make a good bill better.

As I said last week, solar energy is a non-partisan issue, and I know that we can all benefit from harnessing the power of the sun.

I look forward to Members' support for H.R. 2774, and I will continue to work with you as we move to the House Floor next month.

Chairman GORDON. Thank you, Ms. Giffords, for this really very good bill.

Mr. Hall is recognized.

Mr. HALL. Mr. Chairman, H.R. 2774 will provide research and development on yet another important renewable energy source, solar energy.

I fully support research and development on solar power, considering that less than two percent of our energy consumption comes from this renewable source, and it is a reliable source for most Americans. I am happy to hear that the Majority plans to accept a number of amendments that are going to be offered by my Minority colleagues here today.

I think these amendments are going to serve to make your bill a better bill, and I hope it does. I believe the amendments offered by Representative Bartlett, promoting commercial application of solar lighting technology and solar air conditioning technology, is going to do a lot to advance the use of solar power for everyday use. And Mr. Smith's amendment, to establish a competitive grant program, will encourage state governments and private industry to

team up to demonstrate advanced technology, and I fully support these amendments.

I support the amendment which will be offered by Representative Inglis also, which would strike Section 5 of the bill. I am concerned that that section of the bill, because I don't think it makes sense for the Department of Energy to provide grants to buy equipment or pay private companies to train workers. I understand the need for training, but I don't think that is the best way to achieve that goal.

And I thank the Chairman for bringing up this legislation today, and I yield back the balance of my time. Thank you.

Chairman GORDON. Does anyone else wish to be recognized? Mr. Ehlers is recognized.

Mr. EHLERS. Thank you, Mr. Chairman.

Again, I think—first of all, I would like to point out, the greatest opportunity is in solar energy. There is no more stable overall source than solar energy. It doesn't vary much from day to day or year to year, disregarding the cloud effect.

The supply is ample. And there is an incredible amount of solar energy landing on the Earth every day. It is just almost incomprehensible. It is so much larger than our energy use, it is hard to believe. The difficulty, of course, is that in scientific or engineering terms, solar energy is low quality energy. That means, first of all, that it is very diffuse. It is spread over the entire Earth. It is not concentrated. And secondly, the thermodynamic efficiency of using it is very low, because the temperature of solar energy, as it hits the Earth, is low, compared to, for example, burning fossil fuels.

So, there are lots and lots of opportunities, but a great deal of research to be done yet, and I commend this bill, because it deals with one aspect of the research. But frankly, I don't think that centralized collection facilities are likely to be the answer to the future.

I think, for example, I am hoping that within ten years, solar shingles will be in the same price range as the current asphalt shingles. So, then, we can begin putting solar shingles on houses. That is an ideal use, because that is a diffuse use, it is widespread, and the energy is right, it will be received right at the source where you need it. Again, it is not going to be high quality, but it may well supplant existing methods of heating hot water. It may supplant heating and cooling in the house. Perhaps even electric stoves could be run off the system.

Again, the problem is going to be storage of energy, just as this bill tries to address, but with the improved efficiency of batteries that are being developed for hybrid automobiles, considerably better than we have had before, the storage may become less of a problem. So, I am not saying this to in any way negate the bill before us, but I just want to point out this bill covers just one aspect of the issues that we face.

One other comment, in connection with Mr. Inglis' amendment, to do away with the education. Today, precisely at this time, the Energy and Workforce Committee, I am sorry, it is Education and Labor now, the Education and Labor Committee is considering a bill to provide training for what are called green jobs in the bill.

It is going to be comprehensive. It could easily include this, and it is a well structured bill.

It is sponsored by the Minority, but we are working on it together, and it may well be that the training program in this bill, that Mr. Inglis seeks to strike, could more appropriately be put in that bill. It looks at training for green jobs in every area of life, and every area of operation, including energy. So, I commend the Committee too, and request that they look at that bill, as perhaps a good place to put the training program that is in this bill, because it will be incorporated into all the job training programs that are already under the jurisdiction of the Education and Labor Committee, and operated out of the Labor Department. That is just a suggestion, but I am sure that the Education and Labor Committee would be pleased to incorporate that.

But my main point is solar is the energy of the future. It is an inexhaustible supply. So far as we know, the sun is not likely to go out for roughly a billion years, and by then, I don't think we will be worrying about energy supply problems. I think we will have other things to worry about.

So, I just wanted to add those comments to the record, and I yield back.

Chairman GORDON. Thank you, Mr. Ehlers. Wouldn't it be great if we also had the equivalent of shingles that could go on automobiles, on the surface of automobiles, for that type of, also, energy use?

Mr. EHLERS. If I may respond, the difficulty with transportation, that needs high amounts of energy for brief periods of time, and solar is low amounts of energy over long periods of time.

Chairman GORDON. With storage also.

Mr. EHLERS. Pardon?

Chairman GORDON. But if you can deal with the storage problem.

Mr. EHLERS. That is the issue.

Chairman GORDON. Yeah. With the lithium batteries.

Mr. EHLERS. Exactly. Yeah. It is a good idea, but it needs work. Thank you.

Chairman GORDON. Does anyone else wish to make a comment? Mr. Rohrabacher.

Mr. ROHRABACHER. Let me just note that we, I think we have reached a turning point, where solar energy now does have an enormous potential, not just in the future, but for tomorrow, if we do what is right. Over the years, I have heard a lot of claims from people. In fact, I remember even back in college, hearing claims, when I was a young reporter, 30 years ago, claims that were just not substantiated about what solar energy was potentially then.

However, my reading of it, and studying of the energy issues is that solar energy does offer us, right now, because of the progress we have made, a tremendous asset, if we just invest in it. So, I am very happy to support this legislation.

Chairman GORDON. I agree, and Ms. Giffords is getting us on that road.

Does anyone else wish to make a comment? 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 amendments in the order of the roster. Without objection, so ordered.

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

Mr. BARTLETT. I am, Mr. Chairman. I have two amendments at the desk, that are related in that they both use sunlight directly, real time. I ask unanimous consent to consider them en masse.

Chairman GORDON. Without objection, so ordered.

Mr. BARTLETT. Thank you very much.

Chairman GORDON. The Clerk will report the amendments.

The CLERK. Amendments to H.R. 2774, offered by Mr. Bartlett of Maryland, amendment #006 and #047.

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

The gentleman is recognized for five minutes to explain his amendments.

Mr. BARTLETT. Thank you. I started studying energy 40 years ago. I have built approximately 50 passive solar powered homes, and designed and built my own solar powered home, that is totally off the grid.

We have been working at a furious pace in this committee to advance a series of bipartisan energy bills. I greatly appreciate the cooperation and collaboration of the gentlewoman from Arizona, Ms. Giffords, and Chairman Lampson, and Chairman Gordon, and their staff. I want to especially thank Adam Rosenberg. They have all worked very hard, and could not have been more receptive to my suggestions to make sure that this very good solar research bill became a better and more comprehensive bill.

Mr. Chairman, I have prepared remarks on these two amendments. I would like unanimous consent to submit them for the record.

Chairman GORDON. Without objection.

Mr. BARTLETT. Thank you, sir.

In the interest of time, I think that the little description in the amendment roster describes what they do. We, with bright sunshine outside, we now have lights turned on this room. There are technologies which could have directed sunlight here, and my first amendment directs a research program in this vein, so that we can light as much of our buildings as possible with direct sunlight.

The second one is a very interesting one. It uses solar energy for air conditioning. Most of the time you need air conditioning, is when the sun is shining. There are some very interesting technologies out there, the ammonia cycle refrigeration is one of them, where we can actually cool with the sun, and my second amendment does that, and I thank you very much for the opportunity of working with you in submitting these amendments.

[The prepared statement of Mr. Bartlett follows:]

PREPARED STATEMENT OF REPRESENTATIVE ROSCOE BARTLETT

I started studying energy 40 years ago, built around 50 passive solar-powered homes and designed and built my own solar-powered home that is off the grid. We have been working at a furious pace in this committee to advance a series of bipartisan energy bills. I greatly appreciate the cooperation and collaboration from the gentlewoman from Arizona Ms. Giffords, and Chairman Lampson and Chairman Gordon and their staffs. I want to especially thank Adam Rosenberg. They all worked very hard and could not have been more receptive to my suggestions to make sure that this very good solar research bill became a better and more com-

prehensive bill. In consideration of time, I request that the balance of my statement be entered into the record. I also request that these two amendments be considered en bloc.

Daylighting Systems and Direct Solar Pipe Technology

I appreciate Chairman Gordon's leadership and his strong commitment and encouragement to our colleagues who serve on other committees to bring good ideas to our attention. We have all had many recent experiences of long term loss of electric power due to intense weather patterns, mechanical or human error causing grid failure, and terrorism. Greater utilization of a wider array of distributed generation and lighting technologies will make our homes and businesses and communities more self-sufficient.

I am grateful to my colleague, Tom Petri, for alerting me to the opportunity to advance this goal by advancing research on daylighting systems and direct solar pipe technology. One of my favorite sayings often invoked by President Ronald Reagan is that there's no limit to how much good that you can accomplish if you don't care who gets the credit.

This amendment would create a program to promote the demonstration and commercial application of direct solar renewable energy devices such as solar light pipes to help develop a diverse array of distributed generation and lighting technologies needed to maintain the reliability of the Nation's power infrastructure. In order to assess the energy savings realized by the use of these direct solar renewable energy devices, the amendment also directs the Secretary of Energy to submit an annual report to Congress of the energy savings data derived from projects covered in this program.

The amendment is designed to support the immediate demonstration and commercial application of proven solar light pipe technology in public and private sector buildings, tunnels and other enclosures. It is aimed to support efforts beyond the current research and development efforts in solar energy technologies being done at research facilities under the auspices of the Federal Government and/or the same which is funded by the Federal Government at private or educational research facilities.

U.S. industry has just begun to commercialize a number of devices such as solar light tubes using solar concentrators, reflectors and lenses, light fibers, and other technologies to direct natural light into buildings, tunnels and other enclosures to augment or replace light from traditional fixtures. For instance, solar light pipes make direct use of sunlight, without the conversion of the sunlight into another form of energy, which is a much more efficient method than indirect use to create electricity. Integrated lighting systems such as solar light pipes provide optimum light levels while reducing or eliminating electricity consumption during daylight hours. Additionally, solar light pipes in these integrated light systems have the capability to measure the resulting savings in kilowatt-hours over traditional sources.

There is authorized to be appropriated $3.5 million for each of Fiscal Years 2008 through 2012 to carry out the activities of this section.

I urge the adoption of this amendment. Thank you.

Solar Powered AC

This amendment adds a section to establish a research, development and demonstration program to promote less costly and more reliable decentralized and distributed solar-powered air conditioning for individuals and businesses. This amendment is designed to produce renewable energy powered decentralized and distributed electricity, reduce peak load electricity demands and contribute to greater resilience of the grid.

This amendment is supported by the:

Department of Energy, Office of Energy Efficiency and Renewable Energy, because it will enhance the ongoing Building America Program

National Renewable Energy Laboratory

Solar Energy Industry Association, SEIA

Western Renewables Group

Austin Energy

Sacramento Municipal Utility District

San Diego Gas & Electric

Peak electricity demand across the U.S.—most glaringly in the Western U.S.—is driven by the spread of central air conditioners powered from the grid. Clipping this fast-rising peak by taking air conditioners OFF the grid, and powering them via solar thermal collectors, will contribute far more to grid stability during times of ex-

cess demand (typically hot summer days), reduce wholesale electricity prices and ease tensions being created across the country to build ever more transmission and distribution capacity. Combining solar thermal collectors with solar powered absorption chillers and thermal storage hold great promise. Improving dessicant dehumidification and developing cost-effective pre-cooling approaches is particularly important across the Southeastern U.S.

Solar-powered decentralized distributed air conditioning instead of the conventional centralized air conditioning would benefit every consumer class: individuals and businesses and industry (large and small customers) with less costly and more reliable peak air conditioning increasing regional grid security and reliability.

Grants made available under this amendment may be used to support the following activities:

(1) to advance solar thermal collectors, including but not limited to, concentrating solar thermal and electric systems, flat plate and evacuated tube collector performance;

(2) to achieve technical and economic integration of solar-powered distributed air-conditioning systems with existing hot water and storage systems for residential applications;

(3) to design and demonstrate mass manufacturing capability to reduce costs of modular standardized solar-powered distributed air conditioning systems and components;

(4) to improve the efficiency of solar-powered distributed air-conditioning to increase the effectiveness of solar-powered absorption chillers, solar-driven compressors and condensors, and cost-effective pre-cooling approaches

(5) to research and compare performance of solar-powered distributed air conditioning systems in different regions of the country including potential integration with other on-site systems, such as solar, biogas, geothermal heat pumps, and propane assist or combined propane fuel cells, with a goal to develop site-specific energy production/management systems that ease fuel and peak utility loading.

There is authorized to be appropriated $2.5 million for each of Fiscal Years 2008 through 2012 to carry out the activities of this section. Industry will provide a cost-shared contribution of 20 percent for research and development and 50 percent for demonstration and deployment projects.

I urge my colleagues to approve this amendment.

Chairman GORDON. Thank you, Mr. Bartlett. I know this may sound weird to you, but I think this is fun, to bring these new ideas, and I mean, I am really enjoying making these bills better, and again, I thank everyone for bringing their unique thoughts to this, and you know, their past experiences.

Does anyone else wish to discuss this amendment? If not, then the vote occurs on the amendment, or the amendments. All in favor, say aye. Aye. Opposed, no. The amendments are agreed to.

And now, let me see, we turn to Mr. Inglis. The third amendment on the roster is offered by the gentleman from South Carolina.

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

Chairman GORDON. The Clerk will report the amendment.

The CLERK. Amendment to H.R. 2774, offered by Mr. Inglis of South Carolina.

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

The gentleman is recognized for five minutes to explain his amendment.

Mr. INGLIS. And I thank the Chairman.

You know, sometimes, you move to amend a bill, and you really don't feel too bad about it, because the author is somebody that you wouldn't mind correcting. That is not the case here. The author

here is so pleasant to deal with, it is very hard to offer an amendment that takes one of the pieces out of the bill. But here goes. I will do it nicely, Gabrielle.

Anyhow, my concern generally about grants is that what we do is we collect up tax money in the states, we bring it here to Washington, we set up grant readers and grant writers and regulations and regulators, and then, we take the money back to the districts, and what started out as a bucketful of water ends up being a thimbleful when it gets back, because the people got to eat, if they are grant writers and readers and regulators, and so, I am generally disinclined toward grant programs that do that. I am very disinclined if they are small, because then what you end up with is eating a lot of the money in administration.

And as has already been said, this concept is being considered in Education and Labor, so my concern here is we are not doing rocket science. We really are doing very applied work here, which is good, it is very important to do applied work. But the question is should we use the scarce science dollars available to us to help community colleges figure out how to install solar systems, or to set up curricula to help people to install solar systems.

And that, I doubt, is the role of the Federal Government, and I doubt it going to be very effective, because, you know, if you are in a sunny state, you are happy to take advantage of this program. If you are in Washington State, let us say, your community college isn't going to get any of this money. And so, it sets up an equity question as well.

So, my suggestion is that we take this part of the bill out, and stick with the things like Dr. Bartlett was just mentioning, that are so exciting, where you really are doing rocket science, well, maybe not exactly rocket science, but you are doing some science that is more basic research, that the Federal Government has a clear role in, whereas this, my community colleges would love to have this grant, but the question is whether that is the role of the Federal Government to set that up, or whether it is the role of an enterprising community college in an area that has a felt need for this, and perhaps, industries that will immediately latch onto and take it and run with it.

I think that probably in sunny states, that is the case. There will be industries there that get with their community colleges, and say come on, we can do it. Set up a curriculum to teach these people how to do it. We are going to go out and put up these solar systems, and in those cases, it will work, without the thimbleful of money being brought, or thimbleful of water being brought from Washington and dropped on the scene. They will have a bucketful of money in the local community, and they will get it done. And then, the rest of us will learn from it, and some people will make some money out of it, and I like that. Profit is a very good thing, and the market will drive this, and it is a very applied kind of thing that we are talking about here.

So, my amendment simply strikes out that very applied kind of work, but I congratulate the author of the bill on coming up with something that will do some other things that are aimed at the basic science, which is more the role of the Federal Government.

I yield back, Mr. Chairman.

Chairman GORDON. The amender is also a nice person, and presented his amendment in a very courteous way. I think Ms. Woolsey wanted to be recognized.

Ms. WOOLSEY. Thank you, Mr. Chairman. I am so disappointed. I thought the gentleman from South Carolina was going to raise the amount of money in the legislation, because he didn't think it was enough.

But one of our goals, as a nation, when we talk about energy, and energy conservation, and green technologies, is to know that that is the industry of the future, whatever direction we go in. That means jobs. That means we have to have the training for those jobs. We need training for installing. We need to learn how to work safely with these products. We know that we wouldn't ever take our car to a mechanic that we didn't think was trained and ready to take care of our automobile.

So, I just think that your idea that there is not enough money in there, Mr. Inglis, is absolutely right. But we need to start somewhere, and it will prove itself out. I mean, the gentlelady's legislation is going to prove over time that we do need more money in there, for just the purposes that she is trying to advance, and to actually come up with the right kind of training for these folks.

So, there we are, that is where I am. Thank you, Mr. Chairman.

Chairman GORDON. Thank you. Is there further discussion on the amendment? The author of the bill, Ms. Giffords, is recognized.

Ms. GIFFORDS. Thank you, Mr. Chairman, and I want to thank the gentleman from South Carolina as well, because I know we had a discussion, I think last week, about your concerns.

What I heard from our hearing last week was that installing and maintaining solar equipment requires really specific, unique training, that is not typically included in community college courses. I also saw a map that compares the United States to Germany, and whether South Carolina or even, for example, in the Hudson Valley, where Mr. Sarubbi, Professor Sarubbi came from. There is abundant sun across the entire United States, so I understand your concern, but I don't necessarily think that it is applicable.

We know that the installers must learn how to work safely with these photovoltaic systems, to conduct site assessments, work with high voltage wiring, and perform these complicated installations on residential and commercial rooftops. The design of solar systems on either new homes or existing homes—Mr. Udall, as he talked about having to cut down the tree in order to put in his solar system—is pretty complicated.

Large scale commercial solar systems require a high level of expertise at the design side of the business prior to installation, and the solar industry currently does not have the educational infrastructure to develop these skills. As the number of installations grow exponentially, not just in Arizona, but across the country, the need for a ready qualified workforce is paramount to the success of the solar industry.

Mr. Chairman, I used to run my family's tire and automotive business, and I would never believe that my mechanics could go work on an airplane, just as I don't believe that a general electrician can go and install a solar system. The Department of Energy estimates that around 5,000 trained installers may be needed

by 2015, and currently, to date, we have just 365 certified solar electric installers, and 40 certified solar thermal installers, so we have a long ways to go, in terms of the numbers that we need to meet.

The solar industry is made up of many small and mid-sized companies, which cannot afford to start these training programs from scratch, or entirely on their own. They simply don't have the budgets to provide the necessary technical training.

The workforce development section in my bill is pro-small business and also pro-innovation. It is going to help these small businesses with the workforce that they need to remain competitive in a tough business environment that is in a rapidly growing industry. But in addition, Mr. Inglis, I want to make sure that you understand that there is ample precedent for this kind of program. In Title XI of the 2005 *Energy Policy Act,* and I have a copy here if you would like to see it, it includes several energy-related workforce training programs that have had wide bipartisan support.

The Administration's successful High Growth Job Training Initiative, launched by President Bush in 2001, provided 38 partnerships nationwide between community colleges and workforce agencies and employers. Also, the President's Jobs for the 21st Century Initiative, announced at the 2004 State of the Union Address, included a $250 million proposal to help America's community colleges train 100,000 additional workers for the industries that are creating most of the new jobs.

These initiatives help community colleges produce graduates with the skills most in demand by local employers. If we want to expand the use of solar technologies, we need to have these trained workers in solar installation, that can help install and maintain the equipment.

So, I understand what you are saying, Mr. Inglis, but I respectfully disagree with you, and hope that Members will oppose the amendment.

Chairman GORDON. Mr. Inglis, did you change your mind?

Mr. INGLIS. No. But she is very persuasive. No. It sounds like a great business opportunity for somebody to make a lot of money installing these things. I am all for them.

Chairman GORDON. Is there further discussion? If not, the motion is on the amendment. All in favor, say aye. Well, I will—my hearing was a little off there, so I am going to try that again.

Is there further discussion on the amendment? I don't see any, so then, all in favor of the amendment, say aye. Opposed, no. No. It appears that the nays have it. The amendment is not agreed to.

Mr. INGLIS. Mr. Chairman, could we have a roll call on that?

Chairman GORDON. Certainly. The Clerk will call the roll.

The CLERK. Chairman Gordon.

Chairman GORDON. No.

The CLERK. Chairman Gordon votes no. Mr. Costello.

Mr. COSTELLO. No.

The CLERK. Mr. Costello votes no. Ms. Johnson.

Ms. JOHNSON. no.

The CLERK. Ms. Johnson votes no. Ms. Woolsey.

Ms. WOOLSEY. No.

The CLERK. Ms. Woolsey votes no. Mr. Udall.

[No response.]
The CLERK. Mr. Wu.
[No response.]
The CLERK. Mr. Baird.
[No response.]
The CLERK. Mr. Miller.
Mr. MILLER. No.
The CLERK. Mr. Miller votes no. Mr. Lipinski.
Mr. LIPINSKI. No.
The CLERK. Mr. Lipinski votes no. Mr. Lampson.
Mr. LAMPSON. No.
The CLERK. Mr. Lampson votes no. Ms. Giffords.
Ms. GIFFORDS. No.
The CLERK. Ms. Giffords votes no. Mr. McNerney.
Mr. MCNERNEY. No.
The CLERK. Mr. McNerney votes no. Mr. Kanjorski.
[No response.]
The CLERK. Ms. Hooley.
[No response.]
The CLERK. Mr. Rothman.
Mr. ROTHMAN. No.
The CLERK. Mr. Rothman votes no. Mr. Honda.
Mr. HONDA. No.
The CLERK. Mr. Honda votes no. Mr. Matheson.
[No response.]
The CLERK. Mr. Ross.
Mr. ROSS. No.
The CLERK. Mr. Ross votes no. Mr. Chandler.
Mr. CHANDLER. No.
The CLERK. Mr. Chandler votes no. Mr. Carnahan.
Mr. CARNAHAN. No.
The CLERK. Mr. Carnahan votes no. Mr. Melancon.
[No response.]
The CLERK. Mr. Hill.
[No response.]
The CLERK. Mr. Mitchell.
[No response.]
The CLERK. Mr. Wilson.
Mr. WILSON. No.
The CLERK. Mr. Wilson votes no. Mr. Hall.
Mr. HALL. Aye.
The CLERK. Mr. Hall votes aye. Mr. Sensenbrenner.
[No response.]
The CLERK. Mr. Lamar Smith.
[No response.]
The CLERK. Mr. Rohrabacher.
Mr. ROHRABACHER. Aye.
The CLERK. Mr. Rohrabacher votes aye. Mr. Bartlett.
Mr. BARTLETT. Aye.
The CLERK. Mr. Bartlett votes aye. Mr. Ehlers.
Mr. EHLERS. Aye.
The CLERK. Mr. Ehlers votes aye. Mr. Lucas.
[No response.]
The CLERK. Mrs. Biggert.

[No response.]
The CLERK. Mr. Akin.
[No response.]
The CLERK. Mr. Bonner.
[No response.]
The CLERK. Mr. Feeney.
[No response.]
The CLERK. Mr. Neugebauer.
[No response.]
The CLERK. Mr. Inglis.
Mr. INGLIS. Aye.
The CLERK. Mr. Inglis votes aye. Mr. Reichert.
[No response.]
The CLERK. Mr. McCaul.
[No response.]
The CLERK. Mr. Diaz-Balart.
[No response.]
The CLERK. Mr. Gingrey.
[No response.]
The CLERK. Mr. Bilbray.
[No response.]
The CLERK. Mr. Adrian Smith.
Mr. SMITH OF NEBRASKA. Aye.
The CLERK. Mr. Adrian Smith votes aye.
Chairman GORDON. Mr. Wu has joined us.
The CLERK. Mr. Wu is not recorded.
Chairman GORDON. Ms. Hooley has joined us.
Ms. HOOLEY. No.
The CLERK. Ms. Hooley votes no.
Chairman GORDON. Ms. Biggert.
The CLERK. Mrs. Biggert is not recorded.
Ms. BIGGERT. Aye.
The CLERK. Mrs. Biggert votes aye.
Chairman GORDON. Are there other Members who have not been recorded? If not, the Clerk will report.
The CLERK. Mr. Chairman, 7 Members vote aye, 17 Members vote no.
Chairman GORDON. The courteous amendment is not agreed to.

COMMITTEE ON SCIENCE AND TECHNOLOGY

ROLL CALL 1 BILL H.R. 2774 DATE 6/27/07

AMEND # 2 PASSED ___ DEFEATED ✓ VOICE VOTE ___ WITHDRAW ___

SPONSOR/AMENDMENT Inglis

MEMBER	AYE	NO	PRESENT	NOT VOTING
Mr. GORDON, Chairman		✓		
Mr. COSTELLO		✓		
Ms. JOHNSON		✓		
Ms. WOOLSEY		✓		
Mr. UDALL				
Mr. WU		✓		
Mr. BAIRD				
Mr. MILLER		✓		
Mr. LIPINSKI		✓		
Mr. LAMPSON		✓		
Ms. GIFFORDS		✓		
Mr. McNERNEY		✓		
Mr. KANJORSKI				
Ms. HOOLEY		✓		
Mr. ROTHMAN		✓		
Mr. HONDA		✓		
Mr. MATHESON				
Mr. ROSS		✓		
Mr. CHANDLER		✓		
Mr. CARNAHAN		✓		
Mr. MELANCON				
Mr. HILL				
Mr. MITCHELL				
Mr. WILSON		✓		
Mr. HALL	✓			
Mr. SENSENBRENNER				
Mr. LAMAR SMITH, TX				
Mr. ROHRABACHER	✓			
Mr. BARLETT	✓			
Mr. EHLERS	✓			
Mr. LUCAS				
Mrs. BIGGERT	✓			
Mr. AKIN				
Mr. BONNER				
Mr. FEENEY				
Mr. NEUGEBAUER				
Mr. INGLIS	✓			
Mr. REICHERT				
Mr. McCAUL				
Mr. DIAZ-BALART				
Mr. GINGREY				
Mr. BILBRAY				
Mr. ADRIAN SMITH, NE	✓			
Vacant				
TOTALS				

Mr. Chairman, 7 Members vote AYE and 17 vote NO

43 / Quorum /15 vote / 22 Report
Revised 5/16/07

Chairman GORDON. The fourth, fifth, and sixth amendments on the roster are offered by the gentlelady from Texas, and we appreciate her combining these, in the interests of time, and I ask unanimous consent that these amendments be considered en bloc. Without objection, so ordered.

Are you ready to proceed with your amendment, Ms. Johnson?

Ms. JOHNSON. Yes. Thank you, Mr. Chairman.

Chairman GORDON. And I believe there is an amendment at the desk, and the Clerk will report those amendments.

The CLERK. Amendments to H.R. 2774, offered by Ms. Eddie Bernice Johnson of Texas, amendment #068, #071, and #069.

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

The gentlelady is recognized for five minutes to explain her amendments.

Ms. JOHNSON. Thank you, Mr. Chairman, for considering these three amendments. And they can be considered together.

One amendment focuses on Section 5(C) of the *Solar Research and Advancement Act.* Texas is such a prime location for renewable energies, such as solar and wind, and our citizens could benefit greatly from use of these alternative energy sources, if companies could develop and deploy the technology to harness the energy. In order to be able to utilize solar energy on a large scale, companies must be able to capture and store it, so that reliable power can be delivered, even on a cloudy day.

One small amendment adds two words to Section 4(A), pertaining to a study on the method to integrate concentrating solar power and regional electricity transmission systems. This amendment clarifies the study. It should analyze cost-effective approaches for management and large scale integration of concentrating solar power. In devising this amendment, I wanted to make certain that the Secretary report on methods for large scale deployment that are cost-effective, so that companies can actually use them. In addition, such methods must be suitable for broad use in the electric energy system. This small change simply clarifies the aim of the study, and I hope the Chairman will find it acceptable.

The next amendment focuses on Section 5(C) of the *Solar Research and Advancement Act.* This section pertains to the newly established Solar Energy Curriculum Development and Certification Grants Program. The purpose of this comparative grant program is to ensure a supply of well trained individuals to support the expansion of solar energy industry, and my amendment adds a sentence to the end of Section C, Subsection C, that simply says: "Due consideration shall be given to women, under-represented minorities, and persons with disabilities." It has been a primary goal of mine to be sure that these groups are considered fairly for grant programs developed in this committee, and this change is consistent with that goal.

The third amendment also amends Section 5 at the end. It directs the Secretary to make public information, grantee names, institutions, and a brief description of the project. The public pays for this research, Mr. Chairman, so I feel that transparency is in the public's best interest.

And again, I thank the Chairman, Mr. Udall, and Mr. Gordon, the Chairman, for their receptiveness to these changes, and I also thank Ms. Giffords for putting forth this bill.

I urge my colleagues to support these three little amendments, and I thank the Chair, and yield back.

[The prepared statement of Ms. Johnson follows:]

PREPARED STATEMENT OF REPRESENTATIVE EDDIE BERNICE JOHNSON

Thank you, Mr. Chairman, for considering my amendments all together, and for the opportunity to present them to the Committee.

H.R. 2774 contains important policies to encourage research and development pertaining to solar energy.

Texas is a prime location for renewable energies such as solar and wind.

Our citizens could benefit greatly from use of these alternative energy sources, if companies could develop and deploy the technology to harness the energy.

In order to be able to utilize solar energy on a large scale, companies must be able to capture and store it so that reliable power can be delivered, even on a cloudy day.

One small amendment adds two words to Section 4(a), pertaining to a study on methods to integrate concentrating solar power into regional electricity transmission systems.

My amendment clarifies that the study shall analyze cost-effective approaches for management and large-scale integration of concentrating solar power.

In devising this amendment, I wanted to make certain that the Secretary report on methods for large-scale deployment that are cost-effective, so that companies can actually use them.

In addition, such methods must be suitable to broad use in the electric energy system.

This small change simply clarifies the aim of this study, and I hope the Chairman will find it acceptable.

The next amendment focuses on Section 5(c) of the *Solar Research and Advancement Act.*

This section pertains to the newly-established "Solar Energy Curriculum Development and Certification Grants" program. The purpose of this competitive grant program is to ensure a supply of well-trained individuals to support the expansion of the solar energy industry.

My amendment adds a sentence to the end of Subsection C that simply says, "Due consideration shall be given to women, under-represented minorities and persons with disabilities."

It has been a primary goal of mine to be sure these groups are considered fairly for grant programs developed in this committee, and this change is consistent with that goal.

The third amendment also amends Section 5, at the end. It directs the Secretary to make public information grantee names, institutions, and a brief description of the project.

The public pays for this research, Mr. Chairman, so I feel that transparency is in the public's best interest.

Again, I thank Chairmen Lampson and Gordon for their receptiveness to these changes to H.R. 2774, as well as Ms. Giffords for offering the bill, and I urge my colleagues to support the amendments.

Thank you. I yield back.

Chairman GORDON. Thank you, Ms. Johnson. As usual, you make another constructive improvement to this bill. You do this time and time again. Thank you for that.

Is there anyone else that would like to discuss the amendments? If no, the vote occurs on the amendments. All in favor, say aye. Aye. Those opposed, no. The ayes have it. The amendments are agreed to.

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

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

Chairman GORDON. The Clerk will report the amendment.

The CLERK. Amendment to H.R. 2774, offered by Mr. Hall.

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

The gentleman is recognized for five minutes to explain his amendment.

Mr. HALL. Mr. Chairman, I thank you, and my amendment would strike the section of the bill relating to research and development of thermal energy storage technologies, and replace it with a more comprehensive approach to research and development on energy storage systems that would benefit all the renewables.

As several of the witnesses expressed at the hearing on this bill, energy storage systems for intermittent sources, such as wind and solar, are very similar, and this would include thermal storage systems, but would not limit research and development on energy storage to this one area. This language is included in a larger energy bill that was introduced, that I introduced, and several Minority Members of this committee joined.

It is my understanding, Mr. Chairman, that your staff is currently working on an all-inclusive renewable energy storage bill, and I am of the hopes, and I believe this language would probably fit well with those efforts of yours. If I could have your assurance that every effort would be made to address a more comprehensive approach to energy storage systems, and include the Minority in the drafting, which I believe you will do, you have always been kind enough to do that, that legislation, then I would withdraw my amendment.

Chairman GORDON. Thank you, Mr. Hall. I look very forward to working with you on this joint bill.

Mr. HALL. This one, I am going to win. I withdraw my amendment.

Chairman GORDON. We will give you another——

Mr. HALL. I yield back my time.

Chairman GORDON. Thank you. We will give you a chance to win another one here. The eighth amendment on the roster is offered also by the gentleman from Texas, Mr. Hall. Are you ready to proceed with your amendment?

Mr. HALL. Mr. Chairman, I have an amendment at the desk.

Chairman GORDON. The Clerk will report the amendment.

The CLERK. Amendment to H.R. 2774, offered by Mr. Smith of Texas.

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

The gentleman is recognized for five minutes, and I understand that he is standing in for Mr. Smith's good bill.

Mr. HALL. Yes. This was Lamar Smith's amendment, and this amendment establishes a competitive grant program to encourage state governments and private industry to team up to demonstrate advanced technology.

All states are eligible to participate in and are required to contribute at least 10 percent of the funding. The Federal Government matches the grant, at a maximum of 40 percent. The rest of the

money comes from utilities or private industry. Since the grants are competitive, there is an incentive for states and utilities to pledge more than the minimum amount.

And Mr. Chairman, I just ask unanimous consent Mr. Lamar Smith's amendment summary into the record, and with that, why this language was included in H.R. 5655 in the last Congress. It has broad bipartisan and industry support. I would ask unanimous consent to put that in the record.

Chairman GORDON. Without objection, yes.

Mr. HALL. The full statement of Mr. Smith in the record.

Chairman GORDON. The full statement of Mr. Smith will be introduced in the record. I will say that we have worked with him extensively on this, and I think it is a very good amendment.

Mr. HALL. With this, I yield back my time.

[The prepared statement of Mr. Smith follows:]

PREPARED STATEMENT OF REPRESENTATIVE LAMAR SMITH

Solar power is clean, efficient and plentiful. It has zero emissions and zero waste.

Despite the clear benefits of solar energy, it represents less than one percent of America's current energy output—a number we need to increase.

My amendment establishes a competitive grant program to encourage state governments and private industry to team up to demonstrate advanced photovoltaic technology.

This amendment takes an efficient, cost-effective approach. Under this amendment, states are required to contribute AT LEAST 10 percent of the grant funding.

The Federal Government matches the grant at a MAXIMUM of 40 percent. The rest of the funds would come from utilities or private industry.

Since the grants are competitive, there is an incentive for states and utilities to pledge much more than the minimum amounts.

Furthermore, every state would be eligible to participate in the program. The program's funding starts with $15 million the first year and ramps up to $70 million in 2013.

While this funding will be the start of many solar projects across the Nation, I am pleased to know that many local communities have already begun to embrace solar technology and realize its benefits, including several cities within my district.

As many of you probably heard, Austin, Texas, was recently named the 2007 Solar America City. This designation demonstrates the value that the City of Austin and its leadership have placed in implementing and researching solar technologies.

And in my hometown of San Antonio, CPS Energy recently announced a solar energy joint project to install an array of 200-kilowatt solar panels at the top of a 67,000-square-foot former warehouse facility.

I am hopeful that this amendment will encourage further solar technology utilization. By encouraging communities to embrace solar energy we can increase demand for solar power, broaden our knowledge of the technology and eventually lower its costs.

This amendment is about energy security, national security, and environmental security, and I look forward to its passing.

I thank Chairman Gordon for agreeing to accept my amendment. And I also thank my Texas colleague, Ralph Hall, for his work on this issue.

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

Now, the ninth and seemingly last amendment on the roster is offered by the gentleman from Oregon, Mr. Wu. Are you ready to proceed with your amendment?

Mr. WU. Yes, I am, Mr. Chairman.

Chairman GORDON. The Clerk will report the amendment.

The CLERK. Amendment to H.R. 2774, offered by Mr. Wu of Oregon.

Chairman GORDON. I ask unanimous consent to dispense with the reading. And without objection, so ordered.

The gentleman is recognized for five minutes to explain the amendment.

Mr. WU. Mr. Chairman, because I am having a vote at this moment, in another committee in which I am serving, I would ask unanimous consent that my remarks be inserted in the record.

Chairman GORDON. Without objection.

[The prepared statement of Mr. Wu follows:]

PREPARED STATEMENT OF REPRESENTATIVE DAVID WU

Thank you Mr. Chairman. My amendment is simple; it clarifies that community colleges are explicitly eligible to compete for grants under section five of H.R. 2774.

As the Committee report states: a certified well trained workforce is critical to the success of the solar power industry. Currently there are only 365 certified solar electric installers and 40 certified solar thermal installers in the United States.

With an estimated 5,000 certified workers needed by 2015, the United States currently lacks the necessary workforce to meet the growing demand for solar energy. The Curriculum Development and Certification Grants program is necessary to properly train a sufficient number of solar energy workers.

The report states that programs in New York and Florida have successfully partnered with community colleges to train a workforce to meet local demand.

As drafted, H.R. 2774 does not mention community colleges as explicitly eligible to compete for the federal funding. Given the success in New York and Florida, H.R. 2774 should be amended to clarify that community colleges are eligible.

Community colleges are essential institutions in the United States. More than 11 million students attend a community college. Community colleges have unique, responsive relationships with area businesses. These partnerships help keep local economies strong, and contribute to our nation's success in competing in an evolving global economy.

As alternative energies such as solar power become critical components of the U.S. energy demand, it is important for local community colleges to be included in the training of certified solar energy workers.

My amendment will ensure community colleges are eligible to compete for the grants within the bill, to train the workers who will implement the new way forward toward increased energy security.

Thank you Mr. Chairman, I yield back.

Mr. WU. And I would just recommend this as a very good amendment, and ask for everyone's support. Thank you.

Chairman GORDON. That is the best description I have heard today.

Mr. WU. I yield back the balance of my time.

Chairman GORDON. Does anyone else wish to make comments on this amendment?

Mr. HALL. Mr. Chairman.

Chairman GORDON. Mr. Hall.

Mr. HALL. Inasmuch as Mr. Wu has helped me on my voice voting several times, I want to urge you to pass his amendment. We agree to the amendment.

Chairman GORDON. Thank you, Mr. Hall.

All in favor, say aye. 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. 2774, as amended. All those in favor will say aye. Aye. All those opposed will say no. In the opinion of the Chair, the ayes have it.

I recognize Mr. Hall to offer a motion. Oh, excuse me. I recognize Ms. Giffords, then, to offer a motion.

Ms. GIFFORDS. Thank you, Mr. Chairman, and also, Ranking Member Hall, and again, I just want to thank, one more time,

Chris Garza of my staff, and the Science Committee staff, for all of your help on this bill.

Mr. Chairman, I move the Committee favorably report H.R. 2774, 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.

Chairman GORDON. The question is on the motion to report the bill favorably. Those in favor of the motion will signify by saying aye. Aye. Opposed, no. I notice that are no nos, so apparently, we once again have a unanimous bill. The ayes have it, and the bill is favorably reported.

Without objection, the motion to reconsider is laid upon the table. The Members will have two subsequent calendar days in which to submit supplemental, Minority, or additional views on the measures, ending Monday, July the 2nd, at 9:00 a.m. I move, pursuant to Clause 1 or Rule 2 of the Rules of the House of Representatives, that the Committee authorize the Chairman to offer such motions as may be necessary in the House to adopt and pass H.R. 2774, the *Solar Energy Research and Advancement Act of 2007,* as amended. Without objection, so ordered.

Congratulations, Ms. Giffords, on a very good bill. I thank all of you, the hard core that are still here. We had a good day. Four more bills of a dozen that will go into a good Energy Bill next month, and again, a bipartisan, everybody go home and take credit. Thank you.

[Whereupon, at 1:10 p.m., the Committee was adjourned.]

Appendix:

Subcommittee on Energy and Environment Markup Report, H.R. 2774 as reported, Amendment Roster

COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT
REPORT FROM SUBCOMMITTEE MARKUP
JUNE 21, 2007

H.R. 2774, THE SOLAR ENERGY RESEARCH AND ADVANCEMENT ACT OF 2007

I. Purpose

The purpose of H.R. 2774 is to direct the Secretary of Energy to establish important research and education programs to facilitate the adoption of solar energy technologies.

II. Background and Need for Legislation

H.R. 2774 contains three basic components. The first two are specifically related to concentrating solar power (CSP). A 2006 report by the Western Governors' Association assessed the overall near-term potential for CSP capacity in the American Southwest, taking into account areas of high solar ray intensity, near-level land, non-sensitivity to CSP use, and proximity to transmission. The resulting set of potential plant sites totaled 200 GW of potential power production. To put this in perspective, the electric generating capacity of the entire United States is currently about 1,000 GW. Some significant challenges remain to widespread implementation of CSP, however.

CSP plants produce electric power by converting the sun's energy into high-temperature heat using various mirror configurations. The heat is then channeled through a conventional generator. These plants consist of two parts: one that collects solar energy and converts it to heat, and another that converts heat energy to electricity. Thermal energy storage technology allows this heat to be retained for later use in generating electricity, such as during periods of passing clouds or into the evening.

The *Energy Policy Act of 2005* establishes a CSP research and development program, but storage is not included in the language. Witnesses at the June 19 hearing agreed that this technology is critical to the viability of CSP as a significant energy option. Dr. Dan Arvizu, the Director of the National Renewable Energy Laboratory, noted that "the ability of CSP technologies to store energy presents an opportunity. . .[to] produce baseload power at about five cents per kilowatt-hour. Such systems would include 13–17 hours of thermal storage and would compete with the cost of power from coal plants using carbon sequestration technology. It is expected that an aggressive R&D program could achieve the cost goal by 2020." H.R. 2774 establishes a program dedicated to advancing research and development in thermal energy storage for CSP, authorizing $5 million for this program in FY 2008, and steadily increasing to $12 million in FY 2012.

The bill also tasks the Department of Energy (DOE) with conducting two studies. The first would examine methods to integrate concentrating solar power with regional electricity transmission systems, and to identify new transmission or transmission upgrades needed to bring electricity from high concentrating solar power resource areas to growing electric power load centers throughout the United States. Along with Dr. Arvizu, Mr. Herbert Hayden, Solar Technology Coordinator for the Arizona Public Service (APS), lent his support to this study, explaining that: "Intermittent renewable resources such as wind and solar present special economic challenges for transmission investment because they do not efficiently utilize the transmission investment at all times. . . We believe CSP has a significant potential to provide large amounts of renewable energy to the U.S. and that a federal study on transmission for large scale CSP would be beneficial and appropriate."

The second study would report on methods to reduce the amount of water consumed by concentrating solar power systems, given the strain on water resources in the Southwest. Mr. Hayden and Dr. Arvizu both agreed that minimizing water usage is an important factor in reducing cost. The results of both of these studies will help define a roadmap for large-scale implementation of CSP to meet the Nation's growing energy needs.

The last component of H.R. 2774 addresses the solar industry in general. Having a certified, well-trained workforce to install and maintain solar energy products is critical to the success of the industry. DOE estimates that approximately 5,000 trained installers may be needed by 2015 to accomplish its new Solar America Initiative, and to date, there are just 365 certified solar electric installers and 40 cer-

tified solar thermal installers in the U.S. Some states, such as New York and Florida, working with local community colleges, businesses, the Interstate Renewable Energy Council (IREC), and the North American Board of Certified Energy Practitioners (NABCEP) have recently established successful programs to create a workforce to meet local demand, however there is currently no federal program dedicated to helping establish or improve these training programs across the Nation. H.R. 2774 creates such a program, authorizing $10 million in each year from FY 2008 through FY 2012. The bill instructs DOE to ensure sufficient geographic distribution of training programs nationally, and to only award grants for programs certified by the Institute of Sustainable Power or equivalent industry-accepted quality-control certification institution, or for new and growing programs with a credible path to certification.

At the hearing, testimony supporting this legislation was given by Ms. Jane Weissman, Executive Director of the Interstate Renewable Energy Council and Vice-Chair of the North American Board of Certified Energy Practitioners, as well as from Professor Joseph Sarubbi, Chair of the Building Systems Technology Department at Hudson Valley Community College. Ms. Weissman said that "if market past performance continues and current projections are realized, [current] training opportunities fall far short of expected demand for qualified workers. . . We need more classroom and hands-on training tailored to meet local labor needs. . ." She also noted that "training needs to be based on industry standards so that students are taught the right skills with the right equipment."

In summary, the research and education provisions in H.R. 2774 take several steps beyond what was included in the *Energy Policy Act of 2005* to make solar power a more viable option in the Nation's energy portfolio.

III. Subcommittee Actions

On June 19, 2007, Rep. Gabrielle Giffords introduced H.R. 2774, the *Solar Energy Research and Advancement Act of 2007.*

The Energy and Environment Subcommittee held a hearing on Tuesday, June 19, 2007 to hear testimony on H.R. 2774 from the following witnesses:

- **Mr. Herbert Hayden,** the Arizona Public Service (APS) Solar Technology Coordinator. Mr. Hayden testified on how thermal storage research and development and the bill's proposed studies on grid integration and water usage will help advance the implementation of concentrating solar power.
- **Mr. Rhone Resch,** the President of the Solar Energy Industries Association (SEIA). Mr. Resch testified on the status of the solar industry in general, and on how a proposed research and information program for the industry would help to support research and promote the adoption of solar power across the Nation.
- **Ms. Jane Weissman,** the Executive Director of the Interstate Renewable Energy Council (IREC), and the Vice-Chair of the North American Board of Certified Energy Practitioners (NABCEP). Ms. Weissman testified on the current status of workforce training in solar installation and maintenance across the country, and the need for a national solar workforce training program.
- **Prof. Joseph Sarubbi,** the Chair of the Building Systems Technology Department at Hudson Valley Community College. Prof. Sarubbi will testified on his ground-level experience in creating a solar workforce training program, including his partnership with local businesses and the State of New York in developing a successful curriculum.
- **Dr. David Arvizu** is the Director of the Department of Energy's National Renewable Energy Laboratory. Dr. Arvizu will testified on the DOE's current solar research and development activities, and on his views regarding the proposed legislation.

The Subcommittee on Energy and Environment met to consider H.R. 2774 on June 21, 2007 and consider the following amendment to the bill:

1. An amendment offered by Ms. Giffords, which instructs the Secretary of Energy to establish a program to create and strengthen solar industry workforce training and internship programs across the Nation in installation, operation, and maintenance of solar energy products. The goal of this program is to ensure a supply of well-trained individuals to support the expansion of the solar energy industry. The amendment was agreed to by voice vote.

Ms. Woolsey moved that the Subcommittee favorably report the bill, H.R. 2774, to the Full Committee on Science and Technology. The motion was agreed to by a voice vote.

IV. Summary of Major Provisions of the Bill

H.R. 2774 directs the Secretary to establish a research and development program on thermal energy storage technologies for concentrating solar power (CSP), authorizing $5 million for this program in FY08, increasing to $12 million in FY12 ($43.5 million total). The Secretary is also tasked with conducting two CSP studies. One study will determine the necessary steps to integrate CSP plants with the regional and national electric grid, and the other will examine ways to reduce water usage in CSP plants. The last section of the bill establishes a program to create and strengthen solar industry workforce training and internship programs in installation, operation, and maintenance of solar energy products. $10 million is authorized for this program in each year from FY 2008 through FY 2012.

V. Section-by-Section Analysis of the Bill, as reported by the Subcommittee

Section 1. Short Title

Act may be cited as the "Solar Energy Research and Advancement Act of 2007".

Section 2. Definitions

Provides definitions for the following terms used in the Act: 'Department' and 'Secretary'.

Section 3. Thermal Energy Storage Research and Development Program

Section 3(a) instructs the Secretary to establish a research and development program on thermal energy storage technologies for concentrating solar power. Section 3(b) authorizes appropriations of $5,000,0000 in fiscal year 2008, $7,000,0000 in fiscal year 2009, $9,000,0000 in fiscal year 2010, $10,500,0000 in fiscal year 2011, and $12,000,0000 in fiscal year 2012.

Section 4. Concentrating Solar Power Commercial Application Studies

Section 4(a) instructs the Secretary to conduct a study that will determine the necessary steps to integrate concentrating solar power plants with the regional and national electric grid. Results of shall be submitted to Congress no later than 12 months after the date of enactment of this Act. Section 4(b) instructs the Secretary to conduct a study on methods to reduce the amount of water consumed by concentrating solar power plants. Results of shall be submitted to Congress no later than six months after the date of enactment of this Act.

Section 5. Solar Energy Curriculum Development and Certification Grants

Section 5(a) instructs the Secretary to establish a competitive grant program to create and strengthen solar industry workforce training and internship programs in installation, operation, and maintenance of solar energy products. Section 5(b) describes authorized activities for these grant funds, including support of curriculum development, certification programs, and internship programs. Section 5(c) describes the administration of grants, instructing the Secretary to ensure sufficient geographic distribution of training programs nationally, and to only award grants to certified training programs or new and growing programs with a credible path to certification. Section 5(d) authorizes $10 million for this grant program in each fiscal year from FY 2008 through FY 2012.

H.R. 2774, AS REPORTED BY THE SUBCOMMITTEE ON ENERGY AND ENVIRONMENT

June 21, 2007

1 **SECTION 1. SHORT TITLE.**

2 This Act may be cited as the ''Solar Energy Research
3 and Advancement Act of 2007''.

4 **SEC. 2. DEFINITIONS.**

5 For purposes of this Act:

6 (1) The term ''Department'' means the Depart-
7 ment of Energy.

8 (2) The term ''Secretary'' means the Secretary
9 of Energy.

10 **SEC. 3. THERMAL ENERGY STORAGE RESEARCH AND DE-**
11 **VELOPMENT PROGRAM.**

12 (a) ESTABLISHMENT.—The Secretary shall establish
13 a program of research and development to provide lower
14 cost and more viable thermal energy storage technologies
15 to enable the shifting of electric power loads on demand
16 and extend the operating time of concentrating solar
17 power electric generating plants.

18 (b) AUTHORIZATION OF APPROPRIATIONS.—There
19 are authorized to be appropriated to the Secretary for car-
20 rying out this section $5,000,000 for fiscal year 2008,

$7,000,000 for fiscal year 2009, $9,000,000 for fiscal year 2010, $10,000,000 for fiscal year 2011, and $12,000,000 for fiscal year 2012.

SEC. 4. CONCENTRATING SOLAR POWER COMMERCIAL APPLICATION STUDIES.

(a) INTEGRATION.—The Secretary shall conduct a study on methods to integrate concentrating solar power into regional electricity transmission systems, and to identify new transmission or transmission upgrades needed to bring electricity from high concentrating solar power resource areas to growing electric power load centers throughout the United States. The study shall analyze and assess approaches for management and integration of concentrating solar power into regional electric transmission grids to improve electric reliability, to efficiently manage load, and to reduce demand on the natural gas transmission system for electric power. The Secretary shall submit a report to Congress on the results of this study not later than 12 months after the date of enactment of this Act.

(b) WATER CONSUMPTION.—Not later than 6 months after the date of the enactment of this Act, the Secretary of Energy shall transmit to Congress a report on the results of a study on methods to reduce the amount of water consumed by concentrating solar power systems.

1 **SEC. 5. SOLAR ENERGY CURRICULUM DEVELOPMENT AND**
2 **CERTIFICATION GRANTS.**

3 (a) ESTABLISHMENT.—The Secretary shall establish
4 in the Office of Solar Energy Technologies a competitive
5 grant program to create and strengthen solar industry
6 workforce training and internship programs in installa-
7 tion, operation, and maintenance of solar energy products.
8 The goal of this program is to ensure a supply of well-
9 trained individuals to support the expansion of the solar
10 energy industry.

11 (b) AUTHORIZED ACTIVITIES.—Grant funds may be
12 used to support the following activities:

13 (1) Creation and development of a solar energy
14 curriculum appropriate for the local educational, en-
15 trepreneurial, and environmental conditions.

16 (2) Support of certification programs, such as
17 the North American Board of Certified Energy
18 Practitioners, for individual solar energy system in-
19 stallers, instructors, and training programs.

20 (3) Internship programs that provide hands-on
21 participation by students in commercial applications.

22 (4) Activities required to obtain certification of
23 training programs and facilities by the Institute of
24 Sustainable Power or an equivalent industry-accept-
25 ed quality-control certification program.

1 (5) Incorporation of solar-specific learning mod-
2 ules into traditional occupational training and in-
3 ternship programs for construction-related trades.
4 (6) The purchase of equipment necessary to
5 carry out activities under this section.
6 (7) Support of programs that provide guidance
7 and updates to solar energy curriculum instructors.
8 (c) ADMINISTRATION OF GRANTS.—Grants may be
9 awarded under this section for up to 3 years. The Sec-
10 retary shall award grants to ensure sufficient geographic
11 distribution of training programs nationally. Grants shall
12 only be awarded for programs certified by the Institute
13 of Sustainable Power or an equivalent industry-accepted
14 quality-control certification institution, or for new and
15 growing programs with a credible path to certification.
16 (d) AUTHORIZATION OF APPROPRIATIONS.—There
17 are authorized to be appropriated to the Secretary for car-
18 rying out this section $10,000,000 for each of the fiscal
19 years 2008 through 2012.

COMMITTEE ON SCIENCE AND TECHNOLOGY
FULL COMMITTEE MARKUP
JUNE 27, 2007

AMENDMENT ROSTER

H.R. 2774, the Solar Energy Research and Advancement Act of 2007

No.	Sponsor	Description	Results
1	Mr. Bartlett	Adds new section creating an R&D program in using direct sunlight during the day to light buildings, skipping any conversion to electricity and back to light.	Agreed to by en bloc voice vote with amendment 2.
2	Mr. Bartlett	Adds new section creating an R&D program in solar air conditioning.	Agreed to by en bloc voice vote with amendment 1.
3	Mr. Inglis	Eliminates the solar workforce development program (section 5).	Defeated by roll call vote 17-7.
4	Ms. Johnson	Amends section 5 to require grant recipient information to be made publicly available.	Accepted by en bloc voice vote with amendments 5 and 6.
5	Ms. Johnson	Amends section 4 by making minor changes to the concentrating solar power study.	Agreed to by en bloc voice vote with amendments 4 and 6.
6	Ms. Johnson	Amends section 5 to ensure that the solar workforce development programs give due consideration to women, underrepresented minorities and persons with disabilities.	Agreed to by en bloc voice vote with amendments 4 and 5.

7	Mr. Hall	Amends section 3 by changing the Thermal Energy Storage R&D program into a general Energy Storage R&D program, with the same authorization levels.	Offered and withdrawn.
8	Mr. Smith	Adds a new section creating a nationwide photovoltaics demonstration program, with money divided among all States that submit qualified proposals to DOE.	Agreed to by voice vote.
9	Mr. Wu	Amends section 5 by clarifying that community colleges are eligible under the solar workforce development program.	Agreed to by voice vote.

AMENDMENT TO H.R. 2774
OFFERED BY Bartlett

At the end of the bill, insert the following new section:

1 **SEC. 6. DAYLIGHTING SYSTEMS AND DIRECT SOLAR LIGHT**
2 **PIPE TECHNOLOGY.**

3 (a) ESTABLISHMENT.—The Secretary shall establish
4 a program of research and development to provide assist-
5 ance in the demonstration and commercial application of
6 direct solar renewable energy sources to provide alter-
7 natives to traditional power generation for lighting and il-
8 lumination and to promote greater energy conservation
9 and improved efficiency. All direct solar renewable energy
10 devices supported under this program shall have the capa-
11 bility to provide measurable data on the amount of kilo-
12 watt-hours saved over the traditionally powered light
13 sources they have replaced.

14 (b) REPORTING.—The Secretary shall transmit to
15 Congress an annual report assessing the measurable data
16 derived from each project in the direct solar renewable en-
17 ergy sources program and the energy savings resulting
18 from its use.

19 (c) DEFINITIONS.—For purposes of this section—

1 (1) the term "direct solar renewable energy"
2 means energy from a device that converts sunlight
3 into useable light within a building, tunnel, or other
4 enclosed structure, replacing artificial light gen-
5 erated by a light fixture and doing so without the
6 conversion of the sunlight into another form of en-
7 ergy; and
8 (2) the term "light pipe" means a device de-
9 signed to transport visible solar radiation from its
10 collection point to the interior of a building while ex-
11 cluding interior heat gain in the nonheating season.
12 (d) AUTHORIZATION OF APPROPRIATIONS.—There
13 are authorized to be appropriated to the Secretary for car-
14 rying out this section $3,500,000 for each of the fiscal
15 years 2008 through 2012.

AMENDMENT TO H.R. 2774

OFFERED BY MR. BARTLETT OF MARYLAND

At the end of the bill, insert the following new section:

1 **SEC. 6. SOLAR AIR CONDITIONING RESEARCH AND DEVEL-**
2 **OPMENT PROGRAM.**

3 (a) ESTABLISHMENT.—The Secretary shall establish
4 a research, development, and demonstration program to
5 promote less costly and more reliable decentralized distrib-
6 uted solar-powered air conditioning for individuals and
7 businesses.

8 (b) AUTHORIZED ACTIVITIES.—Grants made avail-
9 able under this section may be used to support the fol-
10 lowing activities:

11 (1) Advancing solar thermal collectors, includ-
12 ing concentrating solar thermal and electric systems,
13 flat plate and evacuated tube collector performance.

14 (2) Achieving technical and economic integra-
15 tion of solar-powered distributed air-conditioning
16 systems with existing hot water and storage systems
17 for residential applications.

18 (3) Designing and demonstrating mass manu-
19 facturing capability to reduce costs of modular

1 standardized solar-powered distributed air condi-
2 tioning systems and components.
3 (4) Improving the efficiency of solar-powered
4 distributed air-conditioning to increase the effective-
5 ness of solar-powered absorption chillers, solar-driv-
6 en compressors and condensors, and cost-effective
7 precooling approaches.
8 (5) Researching and comparing performance of
9 solar-powered distributed air conditioning systems in
10 different regions of the country, including potential
11 integration with other onsite systems, such as solar,
12 biogas, geothermal heat pumps, and propane assist
13 or combined propane fuel cells, with a goal to de-
14 velop site-specific energy production and manage-
15 ment systems that ease fuel and peak utility loading.
16 (c) COST SHARING.—The non-Federal share of re-
17 search and development projects supported under this sec-
18 tion shall be not less than 20 percent, and for demonstra-
19 tion projects shall be not less than 50 percent.
20 (d) AUTHORIZATION OF APPROPRIATIONS.—There
21 are authorized to be appropriated to the Secretary for car-
22 rying out this section $2,500,000 for each of the fiscal
23 years 2008 through 2012.

AMENDMENT TO H.R. 2774

OFFERED BY Mr. Inglis

Strike section 5.

AMENDMENT TO H.R. 2774

OFFERED BY MS. EDDIE BERNICE JOHNSON OF TEXAS

Page 4, line 16, redesignate subsection (d) as subsection (e).

Page 4, after line 15, insert the following new subsection:

1 (d) REPORT.—The Secretary shall make public, via
2 the website of the Department or upon request, informa-
3 tion on the name and institution for all grants awarded
4 under this section, including a brief description of the
5 project as well as the grant award amount.

AMENDMENT TO H.R. 2774
OFFERED BY MS. EDDIE BERNICE JOHNSON OF TEXAS

Page 2, line 13, strike ''approaches for management and'' and insert ''cost-effective approaches for management and large-scale''.

AMENDMENT TO H.R. 2774
OFFERED BY MS. EDDIE BERNICE JOHNSON OF TEXAS

Page 4, line 15, insert ''Due consideration shall be given to women, underrepresented minorities, and persons with disabilities.'' after ''path to certification.''.

AMENDMENT TO H.R. 2774

OFFERED BY Hall

Page 1, line 10, strike "**THERMAL**".

Page 1, line 18, redesignate subsection (b) as subsection (c).

Page 1, lines 12 through 17, strike subsection (a) and insert the following:

1 (a) BASIC RESEARCH PROGRAM.—The Secretary
2 shall conduct a basic research and development program
3 on energy storage systems, including thermal energy stor-
4 age systems, to support electricity transmission and dis-
5 tribution technologies, including—
6 (1) materials design;
7 (2) materials synthesis and characterization;
8 (3) electrolytes, including bioelectrolytes;
9 (4) surface and interface dynamics; and
10 (5) modeling and simulation.
11 (b) APPLIED RESEARCH PROGRAM.—The Secretary
12 shall conduct an applied research and development pro-
13 gram on energy storage systems, including thermal energy
14 storage systems, to support viable electricity transmission
15 and distribution technologies.

AMENDMENT TO H.R. 2774

OFFERED BY MR. SMITH OF TEXAS

At the end of the bill, add the following new section:

1 **SEC. 6. PHOTOVOLTAIC DEMONSTRATION PROGRAM.**

2 (a) IN GENERAL.—The Secretary shall establish a
3 program of grants to States to demonstrate advanced pho-
4 tovoltaic technology.

5 (b) REQUIREMENTS.—

6 (1) ABILITY TO MEET REQUIREMENTS.—To re-
7 ceive funding under the program under this section,
8 a State must submit a proposal that demonstrates,
9 to the satisfaction of the Secretary, that the State
10 will meet the requirements of subsection (f).

11 (2) COMPLIANCE WITH REQUIREMENTS.—If a
12 State has received funding under this section for the
13 preceding year, the State must demonstrate, to the
14 satisfaction of the Secretary, that it complied with
15 the requirements of subsection (f) in carrying out
16 the program during that preceding year, and that it
17 will do so in the future, before it can receive further
18 funding under this section.

19 (3) FUNDING ALLOCATION.—Each State sub-
20 mitting a qualifying proposal shall receive funding

1 under the program based on the proportion of
2 United States population in the State according to
3 the 2000 census. In each fiscal year, the portion of
4 funds attributable under this paragraph to States
5 that have not submitted qualifying proposals in the
6 time and manner specified by the Secretary shall be
7 distributed pro rata to the States that have sub-
8 mitted qualifying proposals in the specified time and
9 manner.

10 (c) COMPETITION.—If more than $25,000,000 is
11 available for the program under this section for any fiscal
12 year, the Secretary shall allocate 75 percent of the total
13 amount of funds available according to subsection (b)(3),
14 and shall award the remaining 25 percent on a competitive
15 basis to the States with the proposals the Secretary con-
16 siders most likely to encourage the widespread adoption
17 of photovoltaic technologies.

18 (d) PROPOSALS.—Not later than 6 months after the
19 date of enactment of this Act, and in each subsequent fis-
20 cal year for the life of the program, the Secretary shall
21 solicit proposals from the States to participate in the pro-
22 gram under this section.

23 (e) COMPETITIVE CRITERIA.—In awarding funds in
24 a competitive allocation under subsection (c), the Sec-
25 retary shall consider—

1 (1) the likelihood of a proposal to encourage the
2 demonstration of, or lower the costs of, advanced
3 photovoltaic technologies; and
4 (2) the extent to which a proposal is likely to—
5 (A) maximize the amount of photovoltaics
6 demonstrated;
7 (B) maximize the proportion of non-Fed-
8 eral cost share; and
9 (C) limit State administrative costs.
10 (f) STATE PROGRAM.—A program operated by a
11 State with funding under this section shall provide com-
12 petitive awards for the demonstration of advanced photo-
13 voltaic technologies. Each State program shall—
14 (1) require a contribution of at least 60 percent
15 per award from non-Federal sources, which may in-
16 clude any combination of State, local, and private
17 funds, except that at least 10 percent of the funding
18 must be supplied by the State;
19 (2) endeavor to fund recipients in the commer-
20 cial, industrial, institutional, governmental, and resi-
21 dential sectors;
22 (3) limit State administrative costs to no more
23 than 10 percent of the grant;
24 (4) report annually to the Secretary on—
25 (A) the amount of funds disbursed;

1 (B) the amount of photovoltaics purchased;
2 and
3 (C) the results of the monitoring under
4 paragraph (5);
5 (5) provide for measurement and verification of
6 the output of a representative sample of the
7 photovoltaics systems demonstrated throughout the
8 average working life of the systems, or at least 20
9 years; and
10 (6) require that applicant buildings must have
11 received an independent energy efficiency audit dur-
12 ing the 6-month period preceding the filing of the
13 application.
14 (g) UNEXPENDED FUNDS.—If a State fails to expend
15 any funds received under subsection (b) or (c) within 3
16 years of receipt, such remaining funds shall be returned
17 to the Treasury.
18 (h) REPORTS.—The Secretary shall report to Con-
19 gress 5 years after funds are first distributed to the States
20 under this section—
21 (1) the amount of photovoltaics demonstrated;
22 (2) the number of projects undertaken;
23 (3) the administrative costs of the program;

1 (4) the amount of funds that each State has
2 not received because of a failure to submit a quali-
3 fying proposal, as described in subsection (b)(3);
4 (5) the results of the monitoring under sub-
5 section (f)(5); and
6 (6) the total amount of funds distributed, in-
7 cluding a breakdown by State.
8 (i) AUTHORIZATION OF APPROPRIATIONS.—There
9 are authorized to be appropriated to the Secretary for the
10 purposes of carrying out this section—
11 (1) $15,000,000 for fiscal year 2008;
12 (2) $30,000,000 for fiscal year 2009;
13 (3) $45,000,000 for fiscal year 2010;
14 (4) $60,000,000 for fiscal year 2011; and
15 (5) $70,000,000 for fiscal year 2012.

AMENDMENT TO H.R. 2774

OFFERED BY MR. WU OF OREGON

Page 3, line 15, insert ", including curriculum for community colleges" after "environmental conditions".