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June 15, 2010

The Honorable Alex Padilla, Chairman
Senate Energy, Utilities and Communications Committee
State Capitol, Room 4038
Sacramento, CA 95814

RE: PIER INFORMATION REQUEST

Dear Senator Padilla:

I have enclosed a response to your April 22, 2010, letter containing your questions about the California Energy Commission's administration of the Public Interest Energy Research (PIER) program.

To begin, I would like to present a review of the program and its public role followed by a discussion of the return on investment and benefits that have accrued to the people of California as a result of PIER.

Following energy market restructuring the Energy Commission designated the PIER program to administer energy research, development, and demonstration (RD&D) efforts. The PIER program ensures that energy RD&D is conducted in harmony with both statute and the state's public interest goals, including energy efficiency, alternative energy development, and climate change analysis.

As you are no doubt aware, energy research, like other RD&D, is inherently risky with no guaranteed outcomes. The PIER program has developed over time to help mitigate this risk through two inter-related structural elements that help define its value to the public: Impartial coordination and strategic partnerships.

First, PIER has evolved to fill the role of an impartial coordinator for RD&D funding among a variety of California stakeholders, ranging from small businesses to universities to California-based national laboratories to utilities and energy companies and to public interest and advocacy groups. The ability to coordinate across these domains sets PIER apart from other research programs, certainly within California. PIER does not serve one organization or group – such as a university – but advocates for the people of California, according to its statutory foundation.

Second, in the past decade, PIER has successfully built a national reputation as a nexus for partnerships in California-based energy RD&D. PIER creates and sustains these partnerships on both the state and national level. The combination of PIER's neutral coordination and strategic partnerships helps PIER avoid research duplication, build on previous successful work, generate new ideas, leverage investments, and ensure that RD&D provides benefits to the state's energy customers. This established array of connections would be difficult to replicate if PIER functions were transferred elsewhere. The organization inheriting these functions would have to establish its own reputation, working relationships, and processes.

PIER's solid reputation and established network of strategic partners enable it to attract and leverage millions of dollars in matching funds from private and public sources. These leveraging efforts have resulted in $1.6 million in total research for every $1 million of PIER funds spent. Similarly, PIER has recently been successful in leveraging federal funds with state dollars. As of today with just $12 million in state funds, PIER has assisted dozens of California projects in attracting over $400 million of American Recovery and Reinvestment Act (ARRA) federal dollars awarded by the U.S. Department of Energy. Additionally, PIER has committed another $20 million in cost share in anticipation of a potential $800 million of federal ARRA funds for California before the program concludes in the spring of 2012.

A KEMA, Inc. report, *Assessment of the Benefits and Costs of Seven PIER-Sponsored Projects* (California Energy Commission publication number CEC-500-2010-013), illustrates that that the public benefit from PIER outcomes clearly outweighs the costs. A 2004 study also indicated that the economic benefits of the PIER program exceeded its costs. The study estimated the total life cycle benefits of 33 products that received PIER funding and were commercialized between 1999 and 2003. Projected benefits resulting from these projects were between 1.3 and 3.4 times larger than the cost of program operation.

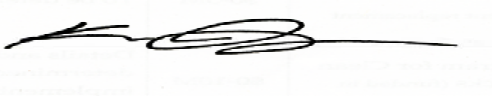
Several PIER projects, many of which are highlighted in the attached response, will provide lasting benefits to the California economy. For example:

- The results of PIER projects have been incorporated into California Title 20 Appliance Efficiency Standards and Title 24 Building Standards and will result in annual costs savings of almost $1 billion for California electric and natural gas ratepayers.
- PIER studies provided underlying scientific evidence that significantly contributed to the passage of AB 32, the California Global Warming Solutions Act of 2006.
- Advanced power grid monitoring software has increased system reliability and prevented cascading blackouts. The software's estimated benefits from reduced outages over a 10-year period range from tens of millions to over $300 million for California and up to nearly $1 billion for the entire Western Coordinating Council region (including California).

The Energy Commission is committed to responsible stewardship of the PIER program on behalf of Californians. This stewardship is illustrated both by the Energy Commission's strict adherence to statutory direction and by administrative adjustments made in response to feedback from the legislature and a 2009 audit initiated by the Energy Commission and conducted by the Department of Finance. With respect to the latter, specific adjustments to the PIER program in recent years include: 1) a reduction of the number of sole source contracts in favor of competitive solicitations; 2) reduction of outside contractors from 19 to 1; and 3) Increased transparency, communication, and effectiveness of the program's policies, procedures, and contracting methods.

Finally, I believe the Energy Commission has a track record that demonstrates willingness to continuously refine and evolve the PIER program to meet the needs of policy makers and California citizens. On my own behalf and that of the other Energy Commissioners and staff, I welcome the coming dialogue regarding the value of the PIER program and suggestions you and others might have to lend further improvements or updates to the program should it be re-authorized in the next year.

Sincerely,



KAREN DOUGLAS
Chairman

Enclosure

cc: Members, Senate Energy, Utilities and Communications Committee
Wade Teasdale

California Energy Commission

PUBLIC INTEREST ENERGY RESEARCH PROGRAM

Overview

California leads the nation in its commitment to energy efficiency and the use of clean energy resources and technologies. This state has some of the most aggressive energy efficiency standards, renewable energy targets, and greenhouse gas reduction goals in the nation and some of the most committed and expert energy professionals in state government. As the state's primary energy planning and policy agency, the California Energy Commission has been instrumental in developing these standards and targets consistent with its mission to provide Californians with energy choices that are affordable, reliable, diverse, safe, and environmentally sensitive. The Energy Commission's Public Interest Energy Research (PIER) program has been an essential element in achieving and maintaining California's role as a national leader in energy research development and demonstration. The information recently requested about PIER by the California Senate Energy Committee provides an opportunity for the Energy Commission to summarize some of these results and address issues for which there may have been some concern.

The Legislature can take pride in having created PIER. In 1996, the California Legislature created an enduring legacy by funding a policy-driven, energy-related research program. Collaborating with other state agencies, the Energy Commission created the state Energy Action Plan that helped guide energy research. Using its contacts with tens of thousands of interested parties around the globe for input, as well as its staff expertise, the Energy Commission's PIER program annually sifts through literally hundreds of research projects touching on all types of generation from geothermal to wind to advanced generation, transmission and distribution, energy efficiency, transportation, and a host of other ideas. The Energy Commission has used its preeminence in the energy world to build a successful and productive research and development program that provides for research and development projects that would not otherwise exist in independent utility, university, federal or private sector research.

PIER investments accelerate advances in energy technology and increase consumer acceptance of new products and business practices. PIER has also significantly reduced manufacturing, product, and energy costs for all Californians. California electric and natural gas ratepayers will save nearly $1 billion per year as a result of PIER research and technologies that have been incorporated into the latest Title 24 Building Efficiency Standards and Title 20 Appliance Efficiency Standards. ***These annual savings alone represent more than ten times one year's cost of the PIER program.*** These same technologies also improve system reliability, remove tons of pollutants including greenhouse gases, and reduce water and energy use.

PIER will continue to push the envelope to provide the clean technologies needed to repower California's electricity system and create the lasting jobs that are essential for a strong economy. PIER is also in a unique position to encourage the innovation needed to jump-start California's

clean energy economy. As noted in the October 2009 cover story in *Time* magazine, California continues to be "an unparalleled engine of innovation, the mecca of high tech, biotech, and now clean tech," *Time* also notes that "the pioneering megastate…is still the cutting edge of the American future."[1]

Background

For more than 10 years, the PIER program has supplemented funding for research that is inadequately funded by competitive or regulated electricity markets. The program conducts research, development, and demonstration (RD&D) in the areas of energy efficiency and demand response, renewable energy resources, advanced electricity generation, electricity transmission and distribution, transportation, and the environment as it relates to energy.

The PIER program was created in 1996 when California's electricity market was restructured by Assembly Bill 1890 (Brulte, Chapter 854, Statutes of 1996). AB 1890 shifted the responsibility for public interest energy-related RD&D from California's investor-owned utilities to state government. This shift represented a major change that was intended to ensure the continuation of public interest energy RD&D while also providing tangible benefits to the electricity and natural gas customers who ultimately fund the research efforts.

In the decade prior to the restructuring of California's electricity market, U.S. investment in electricity-related research and development declined substantially.[2] U.S. Department of Energy (DOE) research funding decreased, as did funding from the Electric Power Research Institute, the national research organization of investor-owned utilities. Between 1993 and 1998, research funding by U.S. electric utilities dropped by 33 percent. In California, spending by investor-owned utilities declined even more dramatically (Figure 1). The U.S. General Accounting Office reported that utility research and development managers expressed concerns that, "if the trend in funding decreases continued, it would result in slowing technology development, sacrificing future prosperity to meet short-term goals, and failing to meet national energy goals."[3]

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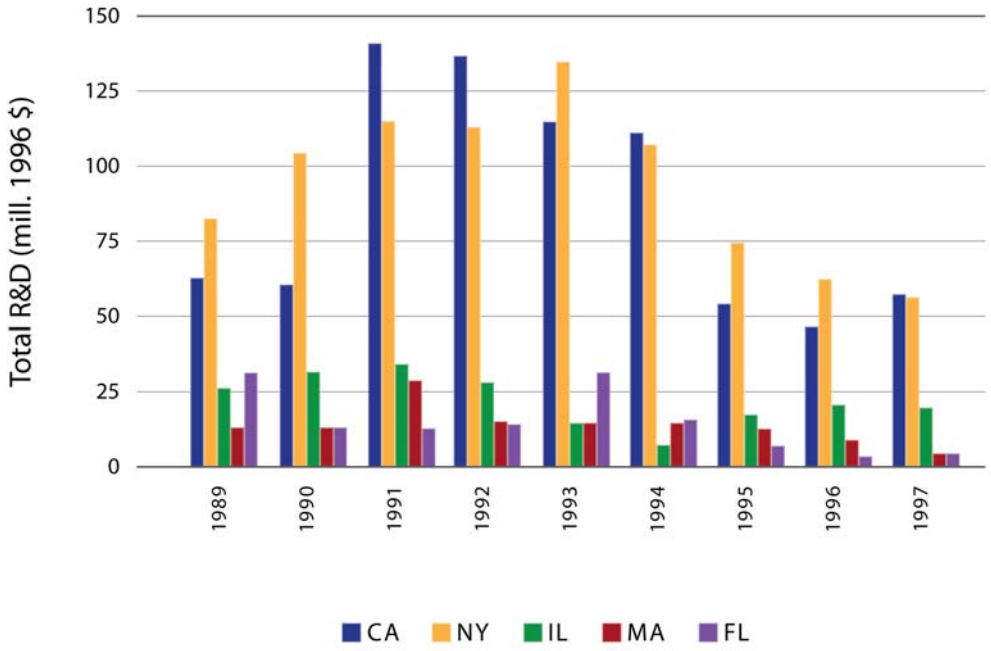
[1] Michael Grunwald, "Why California is Still America's Future," *Time* magazine, October 23, 2009, http://www.time.com/time/nation/article/0,8599,1931582,00.html#ixzz0n5wjc4oG.

[2] *Deregulation, Restructuring and Changing R&D Paradigms in the US Electric Utility Industry*, Paroma Sanyal and Linda R. Cohen, February 2005, http://econpapers.repec.org/paper/wpawuwpio/0504014.htm.

[3] *Changes in Electricity Related R&D Funding*, United States General Accounting Office, August 1996, http://www.gao.gov/archive/1996/rc96203.pdf, page 12.

Figure 1. Research and Development Spending by Investor-Owned Utilities (1989-1997)



California's Energy Policies Drive PIER Investments

The PIER program relies on the statutory guidance provided by the California Legislature to ensure that it selects projects that deliver the highest priority energy research and results. The Energy Commission's research provides new technologies, analytical tools, energy efficiency standards, and protocols to implement this statutory guidance. Before approving any funding awards, the Energy Commission reviews them for consistency with existing energy statutes, foremost of which is Senate Bill 1250 (Perata, Chapter 512, Statutes of 2006), which identifies specific investment categories eligible for PIER funding, including:

- Advanced transportation technologies that reduce air pollution and greenhouse gas emissions.
- Increased energy efficiency in buildings, appliances, lighting, and other applications.
- Advanced electricity generation technologies to increase reductions in greenhouse gas emissions from electricity generation.
- Advanced electricity technologies that reduce or eliminate consumption of water or other finite resources, increase use of renewable energy resources, or improve transmission or distribution of electricity generated from renewable energy resources.

Other relevant statutory guidance includes Assembly Bill 32 (Núñez, Chapter 488, Statutes of 2006). The *Climate Change Scoping Plan* developed by the California Environmental Protection

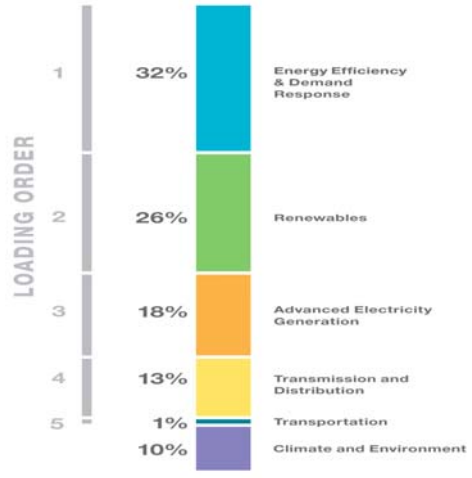
Agency and the California Air Resources Board reaffirmed the importance of the Energy Commission's research efforts toward increased energy efficiency and demand response and the development of renewable electricity sources, all of which are crucial to meeting the state's AB 32 greenhouse gas emission reduction goals.

For the transportation sector, PIER research is also guided by the petroleum reduction goals identified in Assembly Bill 1007 (Pavley, Chapter 371, Statutes of 2005). AB 1007 directed the Energy Commission to develop a statewide plan to increase the use of alternative fuels in California. The *State Alternative Fuels Plan* identified plausible goals to reduce petroleum use in transportation by 11 percent by 2017 and by 26 percent by 2022.[4] The plan further suggested that, by 2050, alternative fuels could provide more than half the energy needed to power California's transportation system. The plan emphasized that continued state and federal government research and development are critical to stimulating alternative fuel commercialization and achieving these goals, underscoring the importance of the PIER program in realizing the state's petroleum reduction targets.

Historically, as a result of efforts to secure the best energy technologies and researchers regardless of location, about 18 percent of the funds provided by the Energy Commission's RD&D program were awarded to businesses and organizations based outside California. In 2008, Assembly Bill 2267 (Fuentes, Chapter 573, Statutes of 2008) directed the Energy Commission to give priority to "California-based entities" for RD&D projects. **The Energy Commission complied with this new statutory direction by modifying its solicitations to award preference points to bidders that meet the criteria for a California-based entity, resulting in 95 percent of available funding going to in-state entities.**

PIER research directives and funding allocations have also closely followed the state's overarching energy policy known as the "loading order."[5] Since 2003, California's loading order has prioritized the development of new resources to meet the state's growing electricity needs first with energy efficiency and demand response, second with renewable energy resources and distributed generation, and finally with advanced electricity generation and infrastructure improvements in transmission and distribution.

Figure 2. PIER Research Priorities



[4] California Energy Commission and California Air Resources Board, *State Alternative Fuels Plan – AB 1007 Report*, December 2007, http://www.energy.ca.gov/2007publications/CEC-600-2007-011/CEC-600-2007-011-CMF.PDF.

[5] *Energy Action Plan Update*, February 2008, CEC-100-2008-001.

Over the life of the PIER program, energy efficiency and demand response have been allocated the largest share – $179.7 million (34 percent) – of the PIER research budget, consistent with the loading order priorities (Figure 2). Similarly, the second largest portion of PIER funding, $131.3 million (24 percent), was applied toward renewable research. Advanced electricity generation research received $101.8 million (19 percent), and transmission and distribution research received $71.5 million (13 percent).

The loading order is not the only energy policy driving the state's research priorities. Consistent with the state's environmental protection and transportation policies, PIER funding for energy-related environmental research totaled $50.2 million (9 percent), and energy-related transportation research, which began receiving PIER funding in 2006, received $5.8 million (one percent) for research intended to advance plug-in electric vehicles and other transportation technologies and adapt vehicles to use renewable fuel sources. These priorities are also consistent with the loading order concept of first focusing on energy efficiency and renewable resources.

PIER's focus will continue to promote and support new and advanced technologies and energy systems that can dramatically reshape and improve the state's electricity system, while also maintaining reliability, increasing cost effectiveness, creating lasting jobs, protecting the environment, reducing greenhouse gas emissions, and contributing to a vibrant and robust state economy.

The Value of PIER

Universities may select research areas based on the goals of their faculty, and electric utilities may use RD&D as a tool to increase shareholder benefits. In contrast, the PIER program's priorities and funding are driven by legislative and state energy priorities and policies. PIER also provides important economic, energy security, and environmental benefits that represent significant social benefits. A 2004 study indicated that the economic benefits of the Energy Commission's RD&D program greatly exceeded its costs. The study estimated the total life cycle benefits of 33 products that received Energy Commission funding and were commercialized between 1999 and 2003. **Projected benefits resulting from these projects were up to 3.4 times greater than the cost of program operation. Applying this estimate to the entire PIER project portfolio suggests that the program provided as much as $2 billion in economic benefits over its 10-plus years,** not including its contributions to the Energy Commission's current building and appliance standards.

Alternative Air Conditioning

PIER funded a research project with the University of California Davis Western Cooling Efficiency Center to develop an alternative to air conditioning in dry climates by circulating cooled water through tubing in floor slabs. WalMart has demonstrated this technology in six of its stores with such success that it will likely become their standard design in hot, dry climates.

Energy Commission research is continually increasing the cost-effectiveness of energy technologies. The results of five RD&D projects – television energy use research, external power supply energy research, residential attic/duct modeling, cool roofs, and residential furnace fan efficiency – have been incorporated into California's Title 24 Building Efficiency Standards and Title 20 Appliance Efficiency Standards. **This investment in RD&D in support of Building and Appliance Standards will result in cost savings of almost $1 billion annually for California electric and natural gas ratepayers.**

PV Tracker

PIER awarded research funds to Powerlight Corporation, a California company, to develop a less expensive photovoltaic tracker system that will provide increased reliability, lower capital costs, and less installation and maintenance time compared to previous designs. Depending on site conditions, the tracker can result in 15 to 35 percent more energy than fixed photovoltaic systems. This tracking system has now been installed in three sites in California and one in Nevada.

PIER also uses its funding to leverage funds from other sources. The Energy Commission modified its research budget for 2009–2010 to leverage American Reinvestment and Recovery Act of 2009 (ARRA) funding while still honoring existing research directions. **PIER committed up to $47.4 million in cost share funding to attract federal ARRA funding, and to date California companies have received over $400 million in ARRA project funding.** Several ARRA solicitations are still in process and represent an additional $562 million that still could be awarded to new RD&D projects in California.

The PIER program has excelled in securing matching funds from other entities due to its national reputation. By creating and sustaining partnerships with key public and private organizations, the Energy Commission is able to attract matching funds and use them in California for RD&D projects. PIER has also established a process to locate and fund the most promising energy projects that will attract matching funds. **Leveraging PIER funds has resulted in $1.6 million in total research funding for every $1 million of PIER funds spent.**

Solar in Food Processing

PIER helped fund the installation of a high-temperature solar thermal system at a Frito-Lay snack food plant located in Modesto, California. Water at temperatures in excess of 450°F is produced by a concentrating solar field, which in turn produces process steam that is converted to hot water for cleaning and sterilization processes and is also used to heat baking equipment and oil for frying. This system will improve plant efficiency with minimal impact on day-to-day production operations.

Another economic benefit of the PIER program is its ability to provide public interest RD&D funding when it is most needed, such as in the earliest phases of project development when project proponents face difficulty in securing outside investors. Similarly, in the technology development and technology demonstration stages, the need for and development benefits of additional RD&D funding increase. As research products get closer to commercialization – typically the most expensive research stage, requiring potentially billions of dollars – the Energy Commission seeks to decrease its funding level and increase funding from others by promoting promising products to venture capitalists

and programs administered by California utilities to support emerging technologies and assist in getting new products to the marketplace.

In addition to the economic benefits of the PIER program, new technologies funded by the program also provide energy security in the form of increased reliability of the state's electricity grid. One example is the Real Time Display Monitoring System (RTDMS), which measures tiny fluctuations on California's electrical grid up to 20 times per second. If unchecked, these fluctuations can lead to wide-ranging power disruptions or blackouts. This technology was used in January 2008 when grid operators at the California Independent System Operator used the RTDMS to detect low-frequency oscillations on the grid. The operators were able to take corrective action quickly to restore normal conditions. Preliminary estimates posit that 30 percent of transmission outages in California electrical service territory could be avoided by the use of this new technology. Estimated benefits from reduced outages over a 10-year period range from up to $170 million for California and up to $470 million for the entire Western Electric Coordinating Council region (which includes California).[6]

Grid Reliability

PIER sponsored the development of software that uses streaming, time-synchronized data to electricity system operators to increase reliability, help prevent cascading blackouts, and help integrate renewable resources like wind and solar into the grid. This software is now being used by the California Independent System Operator, the Bonneville Power Administration, the Tennessee Valley Authority, and all seven centers within the Eastern Interconnection.

The PIER program also contributes to scientific knowledge about the impacts of energy on the environment and vice versa. The Energy Commission was instrumental in commissioning scientific studies regarding the potential catastrophic impacts of climate change on California. Findings from these studies projected a warming trend for the rest of this century, decrease of Sierra Nevada snowpack, reduced reliability of the hydropower units that generate a substantial amount of California's electricity, increased annual and peak demand for electricity, worsening air pollution, more severe heat, and increased public health problems from respiratory and heat-related ailments. Studies also found that increasing

Increased Hydroelectric Production

The PIER-funded Integrated Forecasting and Reservoir Management project is providing a hydrologic tool that combines short- and long-term water and water table forecasts with the state's electrical, agricultural, and flood control policies to provide recommendations for water release from California's network of dams. While the project is not yet concluded, early results indicate that the use of this tool from 2006 through 2008 would have increased the total available water resources by 1.5 million acre feet by the end of 2008, and produced an additional 700 gigawatt hours from hydroelectric production valued at approximately $40 million.

[6] KEMA, Inc *Assessment of the Benefits and Costs of Seven PIER-Sponsored Projects*. California Energy Commission, Media and Public Communications Office. CEC-500-2010-013.

temperature is expected to reduce the availability of water for agricultural productivity and expand the ranges of agricultural pests and pathogens. Incidences of wildfires are projected to increase, and California faces a rising sea level along its 1,100 miles of coastline. These PIER findings, summarized in a highly referenced publication entitled, *Our Changing Climate*,[7] provided scientific evidence that contributed to the passage of AB 32, the California Global Warming Solutions Act of 2006.

Finally, the PIER program helps to reduce the risk inherent in research, which, by its very nature, has no guaranteed positive outcome. The Energy Commission carefully and deliberately assesses all research investments and chooses projects of the highest priority that have the potential to provide the most benefit to California ratepayers using methodical and unbiased evaluation criteria. In addition, the Energy Commission provides for transparency, public input, and review of all proposed PIER research projects by requiring that each is approved at an Energy Commission business meeting.

Improvements in Managing and Administering the PIER Program

Following a decade of evolution and experience, the PIER program has matured, and the Energy Commission has made significant improvements in management and administration of the program based on lessons learned and in response to changing circumstances and legislation.

When the PIER program was established following deregulation of the electricity industry and the virtual elimination of utility research budgets, the near-term goal of the PIER program was to quickly provide transitional funding to continue the most promising public interest RD&D efforts that had been developed by the investor-owned utilities prior to deregulation. Many worthwhile projects would have been left abandoned without new PIER support.

The PIER focus then shifted to developing detailed research roadmaps and attracting high-level and experienced managers to administer the program. Staff was recruited internally to fill civil service positions, and several well-credentialed experts were brought in from outside state service to provide specific technology expertise, research management experience, and up-to-date knowledge of research already underway in other public and private institutions. Staff was also encouraged to network with other research institutions and to learn from the best.

The PIER program benefited from the use of outside resources and was acknowledged as a creative, high caliber, and flexible research program with a rich portfolio of projects. However, although the early program research activities were of high merit, inconsistencies in program administration emerged as a result of rapid program growth and the use of non-state service experts. After eight years of operation, the Energy Commission in 2007 began evaluating PIER administrative processes and procedures to ensure that the program remained aligned and in

[7] *Our Changing Climate*, *Assessing the Risks to California*, California Climate Change Center, July 2006, http://www.energy.ca.gov/2006publications/CEC-500-2006-077/CEC-500-2006-077.PDF.

compliance with state contracting practices and protocols. At the same time, in response to questions raised by certain legislators about PIER contracting policies and procedures, the Energy Commission engaged the Department of Finance to conduct a programmatic audit and review of the PIER program to help identify process improvements that would address these concerns.

The programmatic audit and review, completed in January 2009, recognized that PIER is a unique research and development program and that the Energy Commission's mandate to fund cutting-edge research does not easily fit within the usual state procurement processes. The primary recommendation for improvement was to develop a comprehensive manual on the PIER program that includes programmatic and contracting policies and procedures. Another identified area for improvement was decreasing the use of contractors and replacing them with civil service staff to administer the program. In response, the Energy Commission conducted a careful review of how and where contractors were being used. While the contractors were eminently qualified and brought PIER substantial recognition as a research organization, the Energy Commission decided to reduce significantly the use of contractors for program support and administration. Since 2008, the PIER program has recruited very talented and enthusiastic civil service staff to replace many of these contractors and has reduced its staff support contractors from 19 to a single part-time science advisor.

The audit also noted the need for additional transparency and competition in the contracting process. As a result, the PIER program has reduced the number of sole source contracts in favor of competitive solicitations. **In 2004, PIER awarded 13 sole source contracts; by 2009, PIER had reduced its sole source contracts by more than half, awarding only 7 sole source contracts.**

Future Direction of PIER

The PIER program has made significant contributions that advance science and technology in energy research with benefits that substantially exceed the initial PIER investments. With ongoing support, PIER will continue to further improve technology and energy systems to meet the needs of California's clean energy economy. The Energy Commission R&D staff is well suited to continue directing PIER funding of California energy R&D, particularly since it is impartial and has established important partnerships with a wide variety of California-based stakeholders in the renewable and clean energy sectors, including small businesses, the University of California and California State University systems, community colleges, private universities, California-based national laboratories, other research organizations, utilities and energy companies, and non-governmental and advocacy groups.

In 2005, an independent review and critique of the PIER program conducted by the California Council on Science and Technology concluded that: "In the future, PIER can and should provide the sophisticated planning tools and capabilities that must be available if the state is to set optimal energy policies for both gas and electricity supply, transmission and utilization. The promise of the PIER program is that it can cast its activities in the context of California's unique environmental, economic, and demographic forces. The PIER program can leverage

collaborative work with other states through the Association of State Energy Research and Technology Transfer Institutions, the DOE, and other federal agencies, all in ways that provide California policy makers and administrators the data and information they need to develop well-informed solutions for addressing the state's energy, environmental, and economic needs."[8]

The Energy Commission has formed an Advisory Board to provide strategic guidance on priorities for PIER electricity RD&D. The Advisory Board consists of representatives from the California Public Utilities Commission, consumer organizations, environmental organizations, the investor-owned utilities, and six members of the California Legislature. The 2009–2010 RD&D budget plan is currently following the guidance provided by the Advisory Board in 2009. The Advisory Board will meet again in the autumn of 2010 to assess past and future research portfolio directions, determine if staff initiatives are appropriate, identify RD&D opportunities that may be missing from current plans, discuss the proper emphasis of the various program areas, and develop a strategic plan that anticipates and accommodates new energy research needs.

Experience has shown that California should not expect the federal government or the private sector to carry the full burden of meeting the state's aggressive goals to reduce greenhouse gas emissions. State government leadership demonstrates commitment and resolve to develop renewable and sustainable energy technologies as part of a clean economy. California has historically led the nation with its standards for air and water quality, energy efficiency, green buildings, and vehicle emissions. The state must be prepared to continue its renowned leadership in establishing a greener and more sustainable economy. To do this, California must be prepared to fund the energy RD&D that will develop the innovations and technologies needed to achieve the state's clean energy goals. Innovations and technologies developed within California will also increase the state's competitiveness in the clean tech arena, bringing additional venture capital investment, new companies and industries, and additional jobs to the state.

Legislative Role in PIER Research, Development & Demonstration

The Legislature has played an important role in establishing PIER and making important adjustments over the course of the past 10 years since its creation. The Legislature is also an important partner in PIER's future and the successful implementation of California's energy policy goals and providing leadership for the rest of the nation.

More can be done to advance California's aggressive and innovative climate and energy goals. The Energy Commission looks forward to an ongoing conversation on strategies to further improve this important program.

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[8] *California Public Interest Energy Research Independent PIER Review Panel Report*, California Council on Science and Technology, June 2005, http://fellow.ccst.us/publications/2005/PIER2005.pdf.