BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

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Order Instituting Rulemaking on the Commission's own motion to determine the impact on public benefits associated with the expiration of ratepayer charges pursuant to Public Utilities Code Section 399.8.	Rulemaking 11-10-003 (Filed October 6, 2011)

JOINT OPENING COMMENTS OF THE NATURAL RESOURCES DEFENSE COUNCIL, THE UNION OF CONCERNED SCIENTISTS, THE VOTE SOLAR INITIATIVE, SIERRA CLUB CALIFORNIA, CALIFORNIANS FOR CLEAN ENERGY AND JOBS AND THE NATURE CONSERVANCY

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October 20, 2011

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Pursuant to Rules 1.4(a)(2)(ii) and 6.2 of the Commission's Rules of Practice and Procedure, and the *Order Instituting Rulemaking* issued October 6, 2011 ("OIR") in this proceeding, the Natural Resources Defense Council ("NRDC"), the Union of Concerned Scientists ("UCS"), The Vote Solar Initiative ("Vote Solar"), Sierra Club California ("SCC"), Californians for Clean Energy and Jobs ("CCEJ"), and The Nature Conservancy ("TNC") submit the following joint opening comments. Collectively, NRDC, UCS, Vote Solar, SCC, CCEJ and TNC shall be referred to as the "Joint Parties."

I. BACKGROUND

NRDC is a non-profit membership organization, with more than 250,000 California members and activists with interest in receiving affordable energy services and reducing the environmental impact of California's energy consumption. UCS is a non-profit, membership organization devoted to building a healthier environment and a safer world through the use of rigorous scientific analysis, innovative thinking and committed citizen advocacy. Vote Solar is a California non-profit, public benefit corporation with

Internal Revenue Code ("I.R.C.") § 501(c)(3) status, working to fight global warming, increase energy independence, decrease fossil fuel dependence, and foster economic development by bringing solar energy into the mainstream. SCC comprises 13 chapters of Sierra Club, a national environmental advocacy organization, in California and Nevada with a membership of more than 200,000 Californians. CCEJ represents a diverse coalition of environmental groups, clean tech businesses and investors, public health groups, labor and community organizations whose mission is to support energy policy that creates jobs, reduces carbon emissions, and improves public health. TNC is a non-profit membership organization, with more than 100,000 members in California, whose mission is to preserve the plants, animals, and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. A vast number of members of each of the Joint Parties are individuals or organizations receiving electric service from one of the California investor owned utilities ("IOU").

For these reasons, all of the Joint Parties collectively, and each of the organizations individually, have a direct, specific and critical interest in this proceeding that no other party can represent. Each individual organization will participate as a separate party in this OIR, but the Joint Parties are pleased to present these joint opening comments "reflecting consensus on issues, priorities, schedule and related matters."[1]

II. PROCEDURAL AND SCOPING ISSUES

The Joint Parties have no objections to the categorization of this proceeding as ratesetting, the preliminary determination that hearings are not needed, and the proposed scope and schedule as set forth in the OIR.

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[1] OIR at p.16.

III. RESPONSE OF THE JOINT PARTIES TO THE QUESTIONS POSED IN SECTIONS 3.1, 3.2 AND 3.3 OF THE OIR

Responses to the General Questions

OIR at p. 8, Question 2. *Is it appropriate for the Commission to continue the funding for renewables and R&D purposes at approximately current levels beyond December 31, 2011? Why or why not? What funding levels do you recommend for each of the existing programs and any new programs you recommend? Be as specific and detailed in your recommendations as possible.*

Yes, pending Phase 2 of this proceeding and as modified by the responses to the questions herein, the Commission should continue funding for renewables and R&D at the current levels. As everyone is unfortunately aware, on September 9th, 2011 the California legislative session came to a close without reauthorization of the Public Goods Charge ("PGC"). As the OIR states at page 4:

> *The funding provisions of Pub. Util. Code § 399.8 sunset as of January 1, 2012. Several proposals were considered by the Legislature in 2011 to extend funding collections and make various modifications to the program oversight structure. However, as of the end of the Legislative session on September 9, 2011, no new law had been passed to renew the system benefits charges for energy efficiency, renewables, or R&D. Thus, without further action, the funding provisions will expire automatically on January 1, 2012.*

Both the Governor and legislative leaders have expressed their ongoing intent to craft a reauthorization before the end of the legislative term in 2012. On September 23, 2011, Governor Brown sent a letter to Commission President Peevey requesting that he "take action under the Commission's authority to ensure that programs like those supported by the Public Goods Charge are instituted – and hopefully at their current levels."

The Joint Parties strongly agree with the sentiments in Governor Brown's letter and appreciate the prompt action by the Commission in opening this proceeding. Since

the legislature does not reconvene until January 2012, without prompt action by the Commission the successful renewable energy, energy efficiency and appropriate electricity-related research and development activities funded by California electric customers could be brought to a disruptive halt. Such a halt is neither necessary nor warranted. While there is good reason for the legislature to frame the longer term PGC parameters in reauthorization legislation, the Commission has constitutional and statutory authority to maintain the existing research, development and demonstration programs. Indeed, renewable energy, energy efficiency and appropriate electricity-related public interest research and development investments are necessary if the Commission is to meet its statutory obligations of reducing societal costs of reliable electrical generation, maintain its competitive edge as a clean technology leader for the country, achieve all cost effective energy efficiency,[2] meet California's 33% Renewables Portfolio Standard (RPS)[3] and achieve the greenhouse gas reductions required by AB 32.[4]

The Commission has the general authority to set rates for investor owned public utilities, and the specific ability to consider research, development and demonstration costs when setting those rates. Through the administrative hearing process, the Commission can "establish new rates, classifications, rules, contracts, or practices or schedule or schedules…,"[5] and approve a public utility's application for a new rate.[6] Under Section 740, the Commission has the explicit authority to provide for research, development and demonstration[7] in setting these rates:

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[2] Pub. Util. Code § 454.5(b)(9)(C).
[3] Pub. Util. Code § 399.11(a)
[4] Health and Safety Code § 38560 et. seq.
[5] Pub. Util. Code § 729
[6] Pub. Util. Code § 454
[7] The Public Utilities Code also sets out criteria for evaluating the research and development efforts of gas and electricity providers in section 740.1:

The commission shall consider the following guidelines in evaluating the research, development, and demonstration programs proposed by electrical and gas corporations:
(a) Projects should offer a reasonable probability of providing benefits to ratepayers.
(b) Expenditures on projects which have a low probability for success should be minimized.
(c) Projects should be consistent with the corporation's resource plan.
(d) Projects should not unnecessarily duplicate research currently, previously, or imminently undertaken by other electrical or gas corporations or research organizations.
(e) Each project should also support one or more of the following objectives:
(1) Environmental improvement.
(2) Public and employee safety.
(3) Conservation by efficient resource use or by reducing or shifting system load.

> *For purposes of setting the rates to be charged by every electrical corporation, gas corporation, heat corporation or telephone corporation for the services or commodities furnished by it, the commission may allow the inclusion of expenses for research and development.*[8]

Pub. Util. Code § 740 directly grants the Commission power to fund public research, development, and demonstration projects.[9] California courts afford the Commission a great deal of deference in interpreting Public Utilities Code statutes.[10] Given the plain language of Section 740 and the judiciary's willingness to respect the Commission's interpretation of its governing laws, the Commission has solid legal ground for continuing to factor in research and development costs when setting gas and electricity rates.

The Commission has clear power to "fix rates, establish rules…and prescribe a uniform system of accounts for all public utilities subject to its jurisdiction."[11] Statutorily, the Commission is authorized to "supervise and regulate every public utility in the State and may do all things, whether specially designated in this part *or in addition thereto*, which are necessary and convenient in the exercise of such power and jurisdiction." [12] California courts have described the Commission as "a state agency of constitutional origin with far-reaching duties, functions and powers" whose "power to fix rates [and] establish rules" has been "liberally construed."[13]

The Joint Parties recognize that the Commission's ratemaking ability is not boundless. Obviously, specific statutory limits can constrain the Commission's power to

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(4) Development of new resources and processes, particularly renewable resources and processes which further supply technologies.
(5) Improve operating efficiency and reliability or otherwise reduce operating costs.

[8] Pub. Util. Code § 740.

[9] Before approving a rate, PUC must find that the new schedule is "just and reasonable." Pub. Util. Code §§ 451, 454.

[10] *See S. Cal. Edison, Co. v. Peevey*, 31 Cal.4th 781, 796 (2003) ("CPUC's interpretation of the Public Utility Code 'should not be disturbed unless it fails to bear a reasonable relation to statutory purposes and language'" (citation omitted)).

[11] Cal. Const., art. XII, §§ 1, 6.

[12] Pub. Util. Code § 701 (*emphasis added*).

[13] San Diego Gas & Elec. Co. v. Superior Court, 13 Cal.4th 893, 914-15 (1996), quoting Consumers Lobby Against Monopolies v Pub. Util. Com., 25 Cal.3d 891, 905 (1979).

set rates.[14] Yet, our research on this issue has not unearthed any specific statutory limits on the Commission's ability to set rates incorporating research, development and demonstration investments.

In order to maintain California leadership and momentum in clean energy research and development, and to ensure a long term path toward meeting the state's climate and energy mandates, the Joint Parties recommend the Commission direct the IOUs to continue to fund the existing Public Interest Energy Research program ("PIER") and renewable energy programs administered by the California Energy Commission ("CEC") at the current levels. As discussed below in response to the Commission's questions, this action is well within the Commission's authority. The Joint Parties support swift approval of continued funding for public interest renewable energy and renewable energy-related research, development and demonstration efforts – and recommend deferral of most programmatic changes, including those that may be recommended by the Joint Parties and other parties in comments to Phase 2 of this proceeding.

OIR at p. 8, Question 3. *If you recommend funding be continued, what public benefits are at risk if funding is discontinued?*

California's public interest R&D investments have produced multiple benefits for electricity billpayers, resulting in breakthroughs in energy efficiency and renewable energy, clean energy technology, energy security, environmental protection, and significant bill savings. The PIER program has leveraged substantial private venture funding and government matches, bringing in $70 for every $1 that billpayers invested in 2010.[15] The Energy Innovation Small Grants Program alone, which accounts for only 5% of PIER funding, has led to 10,000 clean technology jobs.[16] The benefits of this program far exceed the costs, which is equivalent to the price of a large cup of coffee per year for the average utility residential customer.[17] California needs to continue these investments in order to meet the state's ambitious clean energy goals.

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[14] *S. Cal. Edison Co.*, 31 Cal.4th at 792 (holding that CPUC's ability to settle a rate issue was not barred unless a specific statute limited it).
[15] PIER: How Public Research Powers California. California Energy Commission. June 2011. p. 4.
[16] Id. at 8.
[17] Id. at 14.

In California, these benefits are pronounced. Prior to electric industry restructuring and establishment of the PIER program, for example, R&D efforts conducted by the Electric Power Research Institute ("EPRI") provided high returns to California's billpayers. A 1994 report by Pacific Gas and Electric Company ("PG&E") on the value of its billpayer funded membership in EPRI showed that over the 1986-1993 period the benefit-to-cost ratio for billpayers was 6 to 1.[18] When the anticipated benefits and costs for the period 1994-1998 were added to the 1986-1993 data, the resulting overall ratio was 5 to 1 for the 13 year period. A Southern California Edison ("SCE") study showed similar results.[19] The high-benefit/cost results indicated that, in general, utility research money was well spent, but the high benefits also suggested to some that there were more potentially high-benefit projects that were not undertaken. Furthermore, a recent study shows that utilities do not invest in energy innovation without government direction – private energy investments are significantly below the market average.[20] These studies support the view that market failures and regulatory barriers have historically discouraged private industry from undertaking certain types of R&D activities, and that this has led to substantial underinvestment in public interest R&D.

Today, billpayers' sole R&D investments are to the electric and natural gas PIER programs, funded at much lower levels than those programs that produced the benefits discussed above. Based on a review of the PIER program from 1998 to 2003, billpayer benefits from these investments are projected to be between $1.60 and $4.10 for every dollar contributed.[21] According to the CEC's 2004 Annual Review, from the inception of the PIER Program through 2003, 33 products have been placed into use in their intended markets and are expected to produce billpayer benefits between $320 million and $822

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[18] Working Group Report on Public Interest Research, Development and Demonstration Activities. Submitted to the CPUC September 6, 1996 in R. 94-04-31. pp 3-7.

[19] Id. at 4.

[20] "Across all U.S. industries, private firms spend an average of 3.5 percent of revenues on R&D. By contrast, utility spending on R&D averages 0.1 percent of revenues." American Energy Innovation Council, *Catalyzing American Ingenuity: The Role of Government in Energy Innovation*, p. 10 (September 2011); "All of these factors together [(1) energy systems and technologies are capital-intensive and long-lived; (2) lack of opportunity for product differentiation; and (3) energy markets are far from perfectly competitive] create a clear and compelling justification for direct government support of energy innovation, particularly given the economic, national security, and environmental interests at stake." *Id.* at 11.

[21] California Energy Commission 2004 Annual Review of the PIER Program Volume 1 - Commercial Successes and Benefits, publication # CEC-500-2005-055-V1. Dated March 2005. p. 3. [hereinafter 2004 Annual Review]

million over their lifetimes.[22] The range of benefits reflects uncertainties in the performance and in the sales projections for the products. As discussed in the 2003 PIER Annual Report, the PIER benefit-to-cost ratio is quite comparable to results reported by other organizations with similar mandates, such as the Gas Research Institute, the Electric Power Research Institute (EPRI), the New York State Energy Research and Development Administration (NYSERDA) and the United States Department of Energy (DOE).[23]

Additional benefits include 5.6 gigawatt-hours of electricity and 8.8 billion cubic feet of natural gas saved; and 730 megawatts of capacity construction avoided, as well as emissions reductions of SO_x (2,000 tons), NO_x (2,700 tons) and CO_2 (1.8 million tons).[24] Other benefits are much more difficult to quantify, though they are still quite real, and include increased jobs and economic activity from the development, manufacture, and sale of products in California, a healthier environment as a result of emissions reductions, an enhanced understanding of how natural resources will be affected by energy-related activities that has led to protective measures, and improved performance and reliability of the electricity system from products that reduce the consumption or improve the transmission and distribution of electricity. The Independent Review Panel found in its 2005 report that:

> *R&D produces the information and the technologies that enable California to consider various options to achieve the goal of the Energy Action Plan. The information gained helps in understanding energy-environmental-economic linkages and in developing the most cost-effective solutions to address California's energy challenges. R&D leads to the development of innovative technologies that help to protect the environment while at the same time stimulating energy-related business activities. R&D provides the basis for sound policy decisions and their implementation and, in this way, contributes substantially to the enhanced living standard of California's citizens. The PIER program has provided vital information and has anticipated this direction by providing options in renewables, clean distributed generation, additional energy*

[22] Id. at 3.
[23] Id. at 3.
[24] Id. at 3.

efficiency measures and developing mechanisms for integration to the transmission and distribution system.[25]

OIR at p. 8, Question 4. *If you recommend certain programs to be eliminated or reduced in scope, provide a rationale for your recommendations.*

With the exceptions noted herein, the Joint Parties do not recommend elimination or reduction in scope of any PGC program at this time. To the extent there are recommendations for elimination or reductions in scope, the Joint Parties recommend the Commission take them up in Phase 2 of this proceeding. Specific comments on how PGC funds should be used for renewable energy investments are contained in our answers to the questions posed by the Commission in Section 3.2 of the OIR.

OIR at p. 8, Question 5. *If you recommend certain programs be increased in scope or new programs be created, provide a rationale for your recommendations.*

See the Response to OIR at p. 8, Question 4, above.

OIR at p. 8, Question 6. *If funding is continued for renewables and R&D programs at any level, should collections continue to come from customers on a volumetric, equal cents per kWh, basis? Why or why not?*

The Joint Parties recommend the Commission maintain the existing volumetric structure. Funding for R&D and renewables programs should continue to be collected on an equal cents per kWh basis. Volumetric collection has several advantages: it sends a conservation signal by tying investment contribution directly to consumption levels, it promotes equity by connecting usage to payment for the public goods needed as a result of electricity consumption and, importantly, it requires the least adjustment, allowing for seamless maintenance of the existing collection. To the extent other collection methods are recommended, the Joint Parties urge the Commission to consider them in Phase 2 of this proceeding.

OIR at p. 8, Question 7. *Should any changes be made to the way funding is currently collected by customer class? Why or why not?*

The Joint Parties have no recommendation at this time, but again recommend that any significant alteration be held for consideration in Phase 2 of this proceeding.

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[25] California Public Interest Energy Research Independent PIER Review Panel Report. California Council on Science and Technology (CCST). June 2005. p. 8.

OIR at p. 8, Question 8. *For how long should your recommended level of funding be continued? Should there be a periodic reevaluation of these public benefits questions and, if so, how often?*

The Joint Parties recommend the Commission approve ongoing collection of the current level of funding, with periodic (5 years) reevaluation. If the legislature reauthorizes the PGC at a different level of funding, those changes will, of course, need to be implemented by the Commission.

OIR at p. 8, Question 9. *Is it reasonable to continue to collect funds in rates in January 2012 and beyond, even if programmatic details on priority expenditures are not yet settled, possibly subject to refund if actual expenditure levels are lower? Why or why not?*

The Joint Parties recommend the Commission continue to fund public research and development under the current CEC regulations and scope until and unless changes are made to the program scope or priorities either in Phase 2 of this proceeding or through legislative action. The Joint Parties believe this is fully warranted because of the success of the current regulations and scope and because of the significant harm to the program and to investments already made by California billpayers from discontinuing funding until a revised scope and set of priorities are adopted. Any modifications should be addressed in Phase 2 of the proceeding.

OIR at p. 9, Question 10. *How would your answers to any of the above questions change if funding were to be made available from allowance revenues as part of a cap and trade program? Could or should system benefits funding and programs be augmented, continued, scaled back, or eliminated if additional revenues become available from cap and trade or other sources?*

Under Phase 1 of this Proceeding, the Joint Parties recommend the Commission set aside the issue of possible augmentation of R&D or renewables funds with allowance revenues from the cap and trade program. The Commission is considering utility cost and revenue issues associated with emission allowances in proceeding R.11-03-012. R.11-03-012 is the appropriate forum to address all proposals for allocating allowance revenues, including the possibility of augmenting R&D and renewables funds previously provided through the PGC. As such, the Joint Parties recommend the Commission

authorize ongoing collection of PGC funds for R&D and renewable energy investment purposes unless a decision is reached in R.11-03-012 that would require a change in how PGC funds should be collected or used. The Joint Parties also note the current level of funding for PIER does not exhaust all available R&D investment opportunities and increased funding could be invested with increasing public benefits. Any opportunity for increased investment, however, should not undermine the Commissions' authority and responsibility to fund research, development and demonstration in this proceeding.

As discussed above and further below, collection of funds for R&D and renewable energy investment purposes is within the Commission's statutory and constitutional authority and is well justified because it will assist California in achieving its long-term greenhouse gas emission reduction target, while simultaneously protecting California's economy and economically disadvantaged energy customers. Increased R&D and renewable energy investments have the potential to strengthen California's economy by attracting and retaining clean technology businesses, stimulating high-quality job growth, and helping to reduce the state's vulnerability to energy price volatility. Research, development, demonstration, and deployment of zero and low carbon technologies will also result in demand for new skills and workers.

Responses to the Renewable Energy Questions

OIR at pp. 9-10, Question 1. *Given the vibrant market activities in renewables in California today, what is the unique added value or distinct rationale for state-level administration of renewables programs, as distinguished from utility procurement activities, RD&D investments, or other similar activities (if any)?*

The state has several programs that encourage or require investment in renewable energy technologies but lacks programs that reduce market barriers for emerging renewable technologies and established technologies whose benefits are not fully captured by market prices. The appropriate focus of the Renewable Portfolio Standard ("RPS") program is on proven technologies that have a relatively low risk of project delay or failure and are able to compete against each other based on the principles of "least-cost" and "best-fit", as outlined by D.03-06-0-71 and D.04-07-029. However, emerging renewable energy resources that have proved the viability of a technology in a

laboratory but not in a commercial setting may still need to validate performance in order to win a commercial contract. The Economic and Technology Advancement Advisory Committee ("ETAAC"), which was formed to advise the California Air Resources Board on investment and implementation opportunities related to the reduction of greenhouse gasses, has pointed out that:

> *The absence of funding for project demonstrations is a significant impediment to the maturation of new technologies and is consistently identified by thought leaders as a major gap in the financial architecture of clean energy. Public sector managers view demonstration as the responsibility of the private sector, while private sector investors view it as too risky.* [26]

The Joint Parties believe that there is unique added value to using billpayer funds to invest in technologies that have moved past the research and development phase, but are not yet mature enough to compete successfully in an RPS solicitation. Supporting such technologies will ultimately create a larger pool of resources for utilities to choose from and create additional and lower cost options for renewable energy investments.

The RPS competitive solicitation process, with its focus on the lowest-priced bids, does not always capture the full suite of energy and non-energy benefits that a renewable energy technology or application can provide. For example, small-scale distributed generation ("DG") installations may pose fewer environmental impacts and avoid costly transmission line upgrades or new construction projects. These projects, while RPS eligible, might not be able to compete against larger projects because they contribute fewer total kWh to a utility's RPS requirement and may be more expensive on a per unit basis. Energy storage technologies, while not eligible for RPS credit, can enhance the integration of renewable energy resources and improve the grid's overall functionality. While energy storage technologies are eligible for incentives under the Small Generator Incentive Program ("SGIP"), incentives are limited to installations where the electricity will be consumed on-site. Utilities are not prohibited in principle from investing in larger-scale storage pilot projects, and in fact the IOUs have invested in a few projects, but cost recovery is not guaranteed for such investments. Market barriers such as these

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[26] ETAACETACC report, February 11, 2008, pp. 2-11.

may prohibit utilities from making investments that would greatly benefit billpayers and aid in the integration of additional clean energy resources into the electrical system.

OIR at p. 10, Question 2. *For existing renewable facilities, particularly biomass, should the existing program be continued as-is? Why or why not?*

As discussed in response to OIR at p. 10, Question 3, below, some modification should be made.

OIR at p. 10, Question 3. *Could the existing facilities be supported in a different way, such as via current competitive RPS procurement by IOUs? If so, how?*

The Joint Parties generally believe that mature renewable energy technologies should compete for contracts in a competitive price environment. Biomass facilities that are currently under contract as "qualifying facilities" should be renegotiated and restructured through the competitive RPS procurement process rather than receive direct subsidies. Under no circumstances should existing biomass operating costs be reduced by directly subsidizing the costs of fuel collection and transportation. Traveling farther and farther away to collect adequate supplies of fuel not only increases transportation costs but degrades air quality. Instead, the Joint Parties suggest that if existing biomass facilities are supported by PGC funds, the money be used to invest in emission control technologies and ultra-low emission turbines that reduce emissions of criteria air pollutants. Details of how such funds would be managed should be addressed in Phase 2 of this proceeding.

OIR at p. 10, Question 4. *Could and/or should the Commission or Energy Commission develop a set-aside program for projects that provide certain energy and non-energy (environmental) benefits to the state? What could a different programmatic approach look like? How would it be administered?*

As described above in response to OIR at p. 10 Question 1, certain established renewable energy technologies and related technologies that support renewables, like energy storage, might not be as competitive on a pure cost basis because they provide energy and non-energy benefits that are not fully captured in their market prices. Renewable energy generation facilities that are constructed on lands that have low development or agricultural value may be less likely to present significant adverse impacts to natural habitats, but may be more expensive to develop than projects located

on biologically sensitive lands if the renewable resource potential is lower than in a sensitive area. The Joint Parties caution against creating a general set-aside program for established technologies at this time, but believe it would be useful for the Commission to consider how PGC funds could offer targeted, transitional support for undervalued established technologies during Phase 2 of this proceeding.

In addition, some "emerging" renewable energy technologies, like methane dairy digesters, also provide non-energy benefits. Dairy digesters prevent methane, a potent greenhouse gas, from escaping into the atmosphere and instead turn it into electricity or usable natural gas. The Commission should consider expanding the scope of the CEC's current "emerging renewables" program, which presently limits incentives to small wind turbines and fuel cells designed to meet a customer's on-site electricity demand to additional technologies that have strong promising value but still need commercial experience.

OIR at p. 10, Question 5. *What is the best approach to supporting new facilities with the same energy and non-energy benefits characteristics as the current facilities supported under the existing renewables program? Is the distinction between "existing" and "new" facilities important to maintain? Why or why not?*

The Joint Parties believe the most useful way to distinguish between different categories of PGC funds reserved for renewable energy technology investments would be to identify promising emerging technologies that need an opportunity to demonstrate viability and economic competitiveness on a commercial scale prior to performing for an RPS program, and established renewable energy technologies that contain undervalued energy and non-energy benefits or would benefit from investments (like emission control technologies) that might not be otherwise be incorporated into a competitive RPS bid. For yet-to-be specified established technologies and applications that do not currently perform in a competitive solicitation process due to undervalued energy or non-energy benefits, this transitional support could be targeted project-specific funding or more widely applied training, development of policy tools, or analyses of current market barriers. The Joint Parties suggest the Commission consider whether additional support for established technologies is needed during Phase 2 of this proceeding.

OIR at p. 10, Question 6. *Should biogas projects or facilities be included in a continued or new program? If so, how, and in what applicable category of renewable energy? Is there a need to treat on-site generation from biogas differently than export of biogas to the gas transmission system?*

The Joint Parties believe it is appropriate for PGC funds to be used to develop and deploy pollution control technologies for biogas generation facilities, and to provide financial and technical assistance to reduce challenges associated with permitting and interconnection. The Joint Parties do not think that PGC funds should treat on-site biogas generation from biogas facilities different from facilities that export gas to a pipeline.

OIR at p.10, Question 7. *Should the NSHP continue to be funded by an order of the Commission? Why or why not?*

Yes, the Joint Parties believe the Commission should take action to continue funding of the NSHP. While fewer funds may be needed in the near term, the continuity of NSHP funding is critical. Understandably, the housing and lending crisis has catastrophically impacted the new housing market. In turn, these crises directly impact the number of megawatts installed through the NSHP.

Nevertheless, the NSHP provides a number of benefits, even in a down housing market, that are unique and irreplaceable. Through NSHP, new homebuyers, including buyers of affordable housing, are offered the opportunity to own a solar system and a highly energy efficient home that they might not otherwise be able to afford or consider buying. The housing industry is introduced to, and gains practical knowledge and experience in, sizing, building, and marketing solar systems and highly energy efficient homes. Continuation of the NSHP funding will ensure that these benefits and established momentum are not lost, such that when the housing market recovers, so too will the demand for highly energy efficient new homes equipped with solar systems.

OIR at p.10, Question 8. *Does the Commission have the authority to order continued funding for the NSHP, given the separate statutory limits on funding for that program and the Commission's California Solar Initiative (CSI) program established by SB 1 (Murray)? Please include specific citations to appropriate code sections in your response to this question.*

Yes, the Commission has the authority to continue NSHP funding. Clearly, the existing Public Goods Charge funding, which currently funds the NSHP, expires January 1, 2012 (Pub.Util.Code §399.8(c)(1) and Pub.Res.Code §25740.5(f)). At the same time, the CSI program, of which the NSHP is a component, expires in 2016 (Pub.Res.Code §2851(a)(1)/(c)(2)/(c)(3)). While this apparent disconnect in the funding sunset date versus the duration date of the NSHP may be a source of confusion, none of the relevant statutory language appears to limit the Commission's ability to rationalize the disconnected provisions by extending the funding. In fact, other sections of both the Public Utilities Code and the Public Resources Code can be read *in pari materia*, thereby indicating that the legislature clearly intended funding to continue beyond 2012 by authorizing an NSHP cap of four hundred million dollars (Pub.Util.Code §2851(e)(3) – an amount definitely not collected by January 1, 2012 – and that the NSHP could continue for as long as thirteen years beyond 2007 (Pub.Res.Code §25740.5(f)).

OIR at p. 11, Question 9. *Should the Commission defer to the Energy Commission to continue to provide guidelines for oversight of the NSHP going forward? If so, how?*

The Energy Commission can continue to provide guidelines for oversight of the NSHP in a manner similar to that which currently exists. Nevertheless, as described in the response to OIR at p. 11 Question 10, immediately below, to address program funding issues, at a minimum the financial oversight of the NSHP should be transferred to the Commission.

OIR at p. 11, Question 10. *If NSHP is continued, should the current investor owned utility administration of the program via contract be transitioned to come under general Commission regulatory oversight, for example as part of or parallel to the Commission's CSI program? If so, how should this arrangement be structured?*

Contracted IOU administration of the NSHP can continue in a manner similar to that which currently exists. However, as described in OIR at p.11 Question 9, immediately above, financial oversight should be transferred to the Commission. Financial oversight of the NSHP by the Commission will allow the Commission to establish regulations, such as the use of memorandum or balancing accounts that address any "over" collection that may result from the down housing market and the manner in which the NSHP portion of the PGC is collected and managed. Consideration of this

issue, however, need not be immediately addressed in Phase 1, but should be addressed in Phase 2.

OIR at p. 11, Question 11. *Besides NSHP, is additional and separate funding needed to support "emerging renewables" that are currently covered by Energy Commission programs? If so, how much and why?*

As stated above in response to OIR at pp. 9-10, Question 1, the Joint Parties believe that there is unique added value to using billpayer funds to invest in emerging technologies that have moved past the research and development phase, but are not yet mature enough to compete successfully in an RPS solicitation. Supporting such technologies will ultimately create a larger pool of resources for utilities to choose from and create additional and lower cost options for renewable energy investments. The Joint Parties do not believe it's necessary at this point to create an additional and separate funding program beyond the CEC's "emerging renewables" program, but the scope of the "emerging renewables" program should be expanded beyond the currently eligible technologies, which are limited to small wind turbines and fuel cells using renewable fuels. In addition, the current "emerging renewables" program limits incentives to technologies that will reduce a customer's on-site generation load. The Joint Parties believe the program should be expanded to include demonstration projects for technologies that are designed to sell electricity directly to the grid. The details of how program criteria should be modified can be addressed in Phase 2 of this proceeding.

OIR at p. 11, Question 12. *Can and should the Commission's Self-Generation Incentive Program cover funding support and administration for the other emerging renewables beyond the NSHP Program, such as for small wind projects and renewable fuel cells? Why or why not?*

The state's SGIP program limits its incentives to clean energy technologies that will reduce a customer's on-site electricity demand. In OIR at p.11 Question 11 directly above, the Joint Parties state that the Commission and the CEC should expand the eligibility of the "emerging renewables" program to allow for a wider set of clean technologies and to allow for projects that are not designed for on-site generation use. If the "emerging renewables" program is expanded, the Joint Parties see no reason to modify the current SGIP program at this time.

OIR at p. 11, Question 13. *What other aspects of the Energy Commission's current program activities warrant continuation (such as local government assistance, consumer education, workforce training, etc.)? Why? At what funding levels?*

Funding for workforce development should continue at current levels, but with close coordination with other workforce development programs. A portion of the resources should go to workforce development planning that is directly tied to RD&D emerging technologies commercialization efforts (as in the California Advanced Lighting Controls Training Program). Workforce development strategies should follow the guidelines developed in the Commission's "California Workforce Education and Training Needs Assessment for Energy Efficiency, Distributed Generation and Demand Response."

OIR at p. 11, Question 14. *If such current activities as local government assistance, consumer education, and workforce training continue, what is the proper administrative structure for those activities?*

The CEC should support local governments with RD&D funds, with focus on achieving reductions in carbon emissions in the energy sector as specified in the AB32 Scoping Plan.

For workforce development programs, the programs should be administered by the responsible agencies. For example, administration of the California Green Partnership Academies, which are public high school programs, should stay with the Department of Education. However, to insure a coordinated state workforce development strategy, to avoid duplication, and to improve the efficiency and effectiveness of workforce investments, the Commission should consider appointing an advisory committee or utilizing an existing oversight body like the Green Collar Jobs Council of the California Workforce Investment Board ("CWIB") or a subcommittee of it, to determine where workforce investments are needed. This should include representatives from community colleges, K-12 education, universities, state-certified apprenticeship programs, utility education programs, the Commission, CEC, and the CWIB. These considerations should be addressed in Phase 2 of this proceeding.

OIR at p. 11, Question 15. *Should the Energy Commission continue to administer these ancillary program activities? If so, how would the Energy Commission receive funding to continue those activities and in what amounts?*

Generally speaking, pending Phase 2 and as modified by the comments herein, the Joint Parties recommend continued administration of all PGC programs in their current manner.

Response to the RD&D Questions

OIR at p. 12, Question 1. *What makes state-level investment in R&D appropriate and unique, and how should it be distinguished from federal government, philanthropic, or industry R&D activities***?**

The public sector has historically been the principal sponsors of long-term, higher risk energy R&D, whereas the private sector has played an important but secondary role from the perspective of overall investment levels in short-term research and technology commercialization efforts.

State-level investments in R&D are not only appropriate, but essential for California to capture the economic, social, and environmental benefits of the clean energy economy. A recent, independent, non-partisan study found that California ranks first in the nation for capturing the benefits of green technologies,[27] and that state-level investments in R&D specifically played a causal role. [28] California's long history of investing in clean technology research, development, and demonstration has positioned it well to benefit from first-mover advantages.[29] State-funded R&D has consistently allowed California to

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[27] "California ranks first in the U.S. in total green technology patents. Specifically, the state is at the top in patents related to Advanced Batteries, Solar Energy, and Wind Energy." Next 10, *California Green Innovation Index*, p.24 (October 2010); "From 2007 to 2009, California represented 39 percent of Solar Energy patents registered in the U.S., up from 24 percent in the period 1995 to 1997." *Id.*

[28] Noting the establishment of California's Public Interest Energy Research program specifically, "California has a history of cutting edge cultural change and technological advance. . . . fueled in part by its world-class research and development talent, precedent setting public policy, and forward-looking population.." *Id.* at 6-8.

[29] "California is clearly benefiting economically from its position as a cleantech innovator and early adopter of energy efficiency and carbon emission reduction measures." Next 10, *New Data Show California Global Leadership in Green Patents, VC Investment, Energy Productivity & Solar Energy Generation*, More Businesses Opening in California Than Closing or Leaving , p. 1 (October 2010).

benefit from its position as a market leader.[30] The California-specific benefits that result from clean energy investments are spread throughout all sectors of the economy, e.g., providing much-needed assistance to the manufacturing sector.[31] Furthermore, California's state-level investments leverage significant amounts of private capital to create a hotbed of innovation here at home.[32] Failure to continue state-level investments in clean energy R&D would undermine a unique and growing bright spot in our state's economy[33] and jeopardize the significant benefits that Californian's have long enjoyed due to strong and consistent state-level support for R&D.[34]

OIR at p. 13, Question 2. *Should a program such as PIER or similar to PIER continue to be funded? Describe any preferred changes or improvements to the existing program or why you would recommend eliminating the program altogether.*

The Joint Parties strongly recommend the continuation of this program. The Joint Parties recommend any changes or improvements be explored in Phase 2 of this proceeding

Long-term, sustained and aggressive public interest research, development and demonstration are necessary to tackle California's long-term clean energy and global warming emissions reduction goals. The California Global Warming Solutions Act of 2006 requires California to reduce statewide greenhouse gas emissions to 1990 levels by 2020.[35] Executive Order S-3-05 sets an even longer-term goal to reduce GHG emissions

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[30] "California's world-class talent, research centers and businesses, coupled with its innovative clean energy policies uniquely position us to invent and deploy technology and benefit as a market leader." *Supra* note 17 at 2.

[31] "From 1995 to 2008, manufacturing employment in core green economy expanded by 19 percent, while there was a nine percent drop in total manufacturing employment. Between 2007 and 2008, green manufacturing employment grew by 1 percent, while total manufacturing employment dropped 4 percent." *Supra* note 19 at 2. "California is experiencing a significant expansion in green manufacturing employment while manufacturing employment in general has been contracting for decades." *Supra* note 17 at 52; "California's manufacturers benefit from higher efficiencies in their use of electricity than manufacturers in the rest of the nation. Since 2002, California's electricity productivity in manufacturing grew by 13 percent, while dropping by ten percent in the rest of the nation. This means California's manufacturers are generating more value while spending less on electricity." *Id.* at 45.

[32] "California has attracted $11.6 billion in cleantech venture capital (VC) since 2006, accounting for 24 percent of total global investment." *Id.* at 2.

[33] In 2010, when the PGC was still in effect, California was noted to be "a global leader in the growing and diverse fields of clean technology, and investment is up in the first half of 2010." *Id.* at 21.

[34] "By investing in technological advance, the deployment of new technology and practices, and in our talent base, California will remain a world leader in green innovation." *Id.* at 6.

[35] Division 25.5 (commencing with Section 38500) of the Health and Safety Code.

to 80 percent below 1990 levels by 2050.[36] These aggressive reduction targets were established because climate change is the pre-eminent environmental challenge of our time. A wholesale transformation of California's (and indeed the nation's and the world's) energy system is needed to stabilize greenhouse gas emissions which will absolutely require substantially increased and targeted investments in R&D programs as well as the creation of new policy mechanisms and educational/workforce training programs.

The California Global Warming Solutions Act (AB 32) requires that "[a]ll state agencies shall consider and implement strategies to reduce their greenhouse gas emissions."[37] Public interest energy research and development advances the goals articulated in AB 32:

> *investing in the development of innovative and pioneering technologies is necessary to assist California in achieving the 2020 statewide limit on emissions of greenhouse gases established by this division and will provide an opportunity for the state to take a global economic and technological leadership role in reducing emissions of greenhouse gases.*[38]

Energy technologies are the primary determinants of energy availability, fuel choice, end use efficiency, and the degree and nature of by-product emissions, and energy R&D is the vehicle by which new technologies become available.[39]

Research, development, and demonstration programs will not only greatly enhance the ability of clean energy technologies to reduce greenhouse gas emissions, but help the state meet the 33 percent by 2020 RPS law. Therefore, R&D should be a priority activity for the state and must be funded at adequate levels because of its critical role in the effort to curb global warming and protect California billpayers form the public health and economic impacts of continuing to rely on fossil fuels.

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[36] EXECUTIVE ORDER S-3-05 by the Governor of the State of California, June 1, 2005.
[37] (Health & Safety Code, § 38592, subd. (a).)
[38] Health & Safety Code, § 38501, subd. (e), emphasis added.
[39] PJ Runci and JJ Dooley. Energy Research and Development. Encyclopedia of Energy. Elsevier Science, Spring 2004. p. 2

OIR at p. 13, Question 3. *What is the appropriate level of funding for R&D efforts to be continued, if any?*

The Joint Parties recommend that in Phase 1 the Commission fund public interest research and development at levels currently approved for PIER. The Joint Parties further recommend the current funding level be considered a minimum and recommend that the Commission explore whether that should be increased, and from what source, in Phase 2.

The existing PIER program, as administered by the CEC, supports research in energy efficiency and demand response, renewable energy generation and integration, technology to improve conventional electric generation, transmission and distribution, climate changes and environmental externalities of energy generation and transportation. These programs have provided and continue to provide significant public benefits to the customers of PG&E, SCE, and San Diego Gas & Electric ("SDG&E"). While it may be appropriate to expand or alter the scope of this investment, the history of success and the tight timeline required for reauthorization before the sunset of the PGC indicate that such changes should be evaluated in Phase 2 of this proceeding. For the time being, the Joint Parties recommend reauthorization of existing programs under the existing rules and administrative structure.

Billpayer funding of R&D is quite low compared to historic levels and certainly compared to the need to meet the challenge of global warming. Over the long term, investments in R&D have been declining nationally. The public sector has historically been the principal sponsors of long-term, higher risk energy R&D, whereas the private sector has played an important but secondary role from the perspective of overall investment levels in short-term research and technology commercialization efforts. Between 1973 and 1981, public sector investments in energy R&D rose to their highest levels as new programs and new institutions formed in response to oil supply interruptions.[40] Energy R&D investments hit their high-water mark during this period and have been in continuous decline for more than 30 years.[41] For example, U.S. energy

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[40] Runci and Dooley. p. 3.

[41] Edmonds, J.A., M.A. Wise, J.J. Dooley, S.H. Kim, S.J. Smith, P.J. Runci, L.E. Clarke, E.L. Malone, and G.M. Stokes. 2007. *Global Energy Technology Strategy Addressing Climate Change: Phase 2 Findings from an International Public-Private Sponsored Research Program.* Joint Global Change Research Institute, College Park, MD. P. 120.

R&D expenditures in 1980 were nearly three times what they are at the turn of the 21st century.[42] The persistent pattern of declining support for energy R&D since 1980 raises concerns about whether or not new classes of energy technologies will be approaching commercial viability when they are needed as part of climate change mitigation strategies.[43] The 2005 federal budget reduced energy R&D by 11 percent from 2004. The American Association for the Advancement of Science projected a decline in federal energy R&D of 18 percent by 2009.[44]

In California, energy R&D funding hit a high in 1991 of nearly $150 million per year before, in response to the emergence of restructuring, dropping off sharply in 1994, to a low of just below $63 million.[45] Investments averaged about $125 million per year through the late 80s/early 90s until about 1994.[46] In an effort to arrest this decline, the system benefits charge was established, which in part funded public interest R&D from electricity billpayer charges. Beginning in 1998, billpayers began contributing to the Public Interest Energy Research (PIER) program at the California Energy Commission through this surcharge. PIER funds electricity-related public interest R&D at a rate of $62.5 million per year.[47] In 2000, a natural gas surcharge was established to fund natural gas-related public interest R&D at a level of about $18 million per year.[48] Natural gas R&D is now funded at $24 million per year.

Current R&D investments on behalf of billpayers are a little more than half (even without accounting for inflation) what they were in 1991. Long-term, sustained and aggressive public interest R&D is necessary to tackle California's long-term clean energy and global warming emissions reduction goals in the most cost-effective manner.

A five to ten-fold increase in R&D investments over current levels can be justified and still deliver substantial benefits. A 2007 analysis conducted by Nemet and Kammen that looked at the feasibility of R&D investment expansion at the federal level,

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[42] Runci and Dooley. p. 3.
[43] Edmonds, p. 122.
[44] Daniel M. Kammen, Gregory F. Nemet, "Real Numbers" (Oct 9, 2005). Issues in Science and Technology. The University of Texas at Dallas.
[45] Working Group Report on Public Interest Research, Development and Demonstration Activities. Submitted to the CPUC September 6, 1996 in R. 94-04-31. Appendix, p. III-3.
[46] Id.
[47] Assembly Bill (AB) 1890 (Chapter 854, Statutes of 1996).
[48] AB 1002 (Chapter 932, Statutes of 2000).

concluded that a five- to ten-fold increase in spending on energy and climate-related R&D could be easily justified in the context of meeting our global warming challenge, and that this magnitude of increase is consistent with the growth seen in several previous federal programs, each of which took place in response to clearly articulated needs.[49] This analysis also found that past experience indicates this investment would be repaid several times over in technological innovations, business opportunities, and job growth, beyond the already worthy goal of developing a low-carbon economy.[50]

The last time that California tried systematically and collectively to estimate the appropriate public interest energy R&D funding levels was in 1996, when the Research, Development and Demonstration Working Group (WG), coordinated by the CEC, did so in response to the Commission's request for information regarding energy R&D activities in a restructured environment. The result was a report to the Commission which included a range of recommended funding levels.[51] This work was done 15 years ago and did not consider the various challenges facing California at this moment. For this reason, the recommendations are likely underestimated yet nonetheless instructive.

One methodology that attempted to estimate optimal public interest investment levels was the Social Investment Approach, the idea of which was "to use economic analysis to find the level of public interest R&D funding which maximizes net social benefits and minimizes energy costs in the long-term within the context of a new competitive market."[52] The rationale for the Social Investment Approach funding estimates was that California should invest in a level of public interest R&D that will provide a more optimal level of societal benefits, as well as lower long-term energy costs.[53] This approach recognized that there have been a number of barriers to utility investment in R&D and it attempted to find a more optimal R&D investment level that would provide real economic benefits to California energy consumers through more efficient, less expensive and cleaner technologies. The funding level estimate from the Social Investment Approach was higher than the other funding estimates included in the

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[49] Gregory F. Nemet and D M. Kammen, "US energy research and development: Declining investment, increasing need, and the feasibility of expansion" (2007). Energy Policy. 35 (1), pp. 746-755.
[50] Id.
[51] Working Group Report 1996. p. 10.
[52] Id., p. 3-7.
[53] Id., p. 3-13.

WG Report, but the cost was quite low on an absolute basis and was more than offset by the benefits this approach was expected to provide.[54] This approach, in 1996, produced a recommended funding level of $225 million per year.[55]

An increase in funding level that is well targeted can be justified and could bring billpayer-funded R&D back up to historical levels to help address unprecedented challenges. The Joint Parties recommend the Commission maintain current funding levels in Phase 1 and consider an increase in funding in Phase 2 of this proceeding.

OIR at p. 13, Question 4. *Should the Energy Commission continue to administer an R&D program (PIER or similar)? If yes, how could such an administrative structure be set up under CPUC regulatory and funding oversight (assuming no statutory requirements are extended or recreated)?*

While there may be several potential administrators of research and development funds, the Joint Parties recommend that the Energy Commission continue to administer the PIER program. In 2004, the Commission deliberated on the question of administration of natural gas research and development funds. In that proceeding, the Commission considered utility, University of California, and CEC administration. While each of these options had certain benefits, the Commission decided on the CEC for a number of reasons – all of which are just as relevant today. In its determination, the Commission relied on the criteria for selection recommended by the CEC in the Testimony of Michael DeAngelis[56]:

> The Public Interest R&D administrator should be the most capable organization in the state to:
>
> - Serve the statewide public interest;
> - Support state energy policies;
> - Address needs of California end use consumers;
> - Maintain public accountability and provide an open, public process in planning, projects selection, management and evaluation;

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[54] Id., p. 3-18.
[55] Id., p. 3-10.
[56] See Attachment 1: Testimony of Michael DeAngelis On Behalf Of The California Energy Commission Concerning The Funding And Administration Of A Natural Gas Public Interest R&D Program. R. 02-10-001, August 15, 2003.

- Provide effective and efficient program administration at reasonable cost;
- Support collaboration and enhancement of R&D capabilities;
- Consist of experienced and qualified staff in managing R&D programs;
- Provide a successful track record for R&D management.
- Support the fair selection of outside R&D performers without internal conflicts in interests.

The Commission agreed with these criteria and determined that the CEC was best suited to meet them. Furthermore, then as now, the CEC already managed a significant R&D program along the lines contemplated by the CPUC. The Commission rightfully saw no reason to establish a second state energy research program, when the infrastructure and staff in place at the CEC was already available. The Commission found that:

> *CEC currently manages the PIER program, and central to its mission is the development of public energy policy. In addition, CEC is subject to the Bagley-Keene Open Meeting Act and the Public Records Act requirements that help ensure public accountability. Consequently we believe CEC is best suited to act as administrator for the gas R&D program.* [57]

The legislative delay in reauthorization of the PGC could mean the disruption of current CEC administration of research and development funds, and such a disruption would undermine the crucial role that these programs play in the pursuit of a cleaner, lower cost energy system. In addition to the significant public benefit of CEC administration found by the Commission, CEC administration is also the most direct path to maintaining research and development funding without disruption.

OIR at p. 13, Question 5. *Alternatively, if you recommend continuing R&D funding with a different administrative structure, please describe your preferred structure.*

The Joint Parties do not recommend R&D with a different administrative structure.

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[57] D. 04-08-010 (August 19, 2004), p. 31.

OIR at p. 13, Question 6. *If a program like PIER or similar is continued, describe your preferred governance structure, process for allocation of funds, and selection methodology for projects.*

The Joint Parties recommend continuation of the PIER governance structure and that any other changes be considered in Track 2 of this proceeding.

OIR at p. 13, Question 7. *Should a new oversight board be created? What would be its role? How would membership be determined and governed?*

The Joint Parties recommend maintaining the PIER Advisory Board.[58] The advisory groups established by the Advisory Board should continue to include broad and balanced expert representation. The Joint Parties further recommend that the oversight of PIER funds incorporate the Commission, The Air Resources Board, the CEC, an IOU, a University of California representative, a national laboratory representative and public stakeholder representatives. The Board should report to the CEC and the Commission, be external to the organization, and include prominent members of the energy R&D community.

OIR at p. 13, Question 8. *Would there be a need for any additional structures such as technical advisory committee or other structures that might facilitate participation from the federal or other state R&D organizations, private investors, industry, environmental or other advocacy organizations, and/or other research institutions?*

The Joint Parties note that the CEC staff recently convened additional subject-specific advisory groups to assist the PIER Advisory Board. The Joint Parties recommend that these groups be continued, but that any additional changes be considered in Phase 2 of this proceeding.

OIR at p. 13, Question 9. *Do any program changes need to be made on the issue of intellectual property rights?*

The Joint Parties have no comment on this issue at this time.

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[58] Noting, however, that any such Board is limited to an advisory role, and would not usurp Commission authority nor the due process rights of stakeholders.

OIR at p. 13, Question 10. *If an R&D program is continued, what are the appropriate metrics for evaluating success or failure of the program?*

The CEC staff has established metrics for each area of R&D investment. The Joint Parties recommend these metrics be continued and the creation of any additional metrics be considered in Phase 2 of this proceeding.

OIR at p. 13, Question 11. *How frequently should any R&D program be evaluated? By whom?*

Performance of a public research and development initiative and its programs should be independently evaluated in a regular (every five years) formal review. In order to provide assurances to the legislature, the Commission, the CEC, and customers that public interest research is operating effectively and providing maximum and cost-effective benefits, a regular, formal independent review process should be established. This review should be established similar to the former Independent Review Panel (IRP) that was formed to evaluate the PIER program and to make recommendations to the Legislature and to the Governor about the PIER program's progress toward becoming a world class R&D effort.[59] The PIER IRP was directed to conduct a comprehensive evaluation of the PIER program, to include a review of the public value of programs including, but not limited to, such factors as the positive impacts and benefits to public health and the environment, and the benefits of those programs in providing funds for technology development that would otherwise not be adequately funded. The Panel also examined PIER program planning and management practices, the context of California's state energy policies, administrative and organizational issues, research review processes and advisory committee functions.

The Joint Parties also recommend a regular, annual reporting of progress by the CEC.

OIR at p. 14, Question 12. *Should R&D investments be focused on projects with an explicit connection to electricity, or should more general environmental and climate change research be funded? Provide a rationale for your response.*

The scope of the public interest energy research and development program must have an appropriate link to electricity generation, provide benefits to billpayers, and be

[59] Public Resources Code Section 25620.9(a).

consistent with the California Global Warming Solutions Act, the Integrated Energy Policy Report, the Energy Action Plan and other state energy policy goals and requirements. This question seems to suggest that climate change research does not have an explicit connection to electricity. The burning of fossil fuels is the primary cause of global climate change. Generation of electricity is the second largest source of greenhouse gas emissions in California. Therefore, the Joint Parties assert that there is indeed an explicit connection between electricity and climate change research. The efforts funded through the public interest energy research program should be in the public interest, meaning they should be directed toward science, technology or projects, the benefits of which accrue to California billpayers and citizens and are not adequately addressed by competitive activities. Investments should focus on developing and demonstrating technologies, processes and applied science and innovative strategic approaches for deploying clean energy technologies that have a high probability of providing real emission reductions, net economic benefits, reducing impacts on low-income communities, and complementing state efforts to improve air quality and reduce toxic emissions.

The program priorities currently include: Buildings End-Use Energy Efficiency; Climate Change Program; Energy Innovations Small Grant Program; Energy-Related Environmental Research; Energy Systems Integration; Environmentally-Preferred Advanced Generation; Industrial/Agricultural/Water End-Use Energy Efficiency; Renewable Energy Technologies; and Transportation Research. The research areas funded by electricity customers should be coordinated with other state research efforts, including AB118, which provides funding for alternative fuel and vehicles development and air quality improvements.

Energy efficiency, renewable energy, and planning for energy needs under changed climate conditions are also ripe for further public interest research. Such investments are well-within the scope of Commission authority that states:

> *a principal goal of electric and natural gas utilities' resource planning and investment shall be to minimize the cost to society of the reliable energy services that are provided by natural gas and electricity, and to improve the environment and to encourage the diversity of energy*

sources through improvements in energy efficiency and development of renewable energy resources, such as wind, solar, biomass, and geothermal energy [and] electrical and natural gas utilities should seek to exploit all practicable and cost-effective conservation and improvements in the efficiency of energy use and distribution that offer equivalent or better system reliability, and which are not being exploited by any other entity.[60]

Examples of relevant climate and environmental research that benefits electricity customers include:

Electricity and Research on the Environment and Climate Change

Research on the environment and climate change including water, forests, wildfire and endangered species is directly related to the electricity sector as illustrated by the following examples of studies funded by PIER.

- Demand / Reliability / Billpayer well being: PIER research has shown that the average temperature in California has increased by 1.8° F over the past century and will continue to increase for decades. This will increase electricity demand for air conditioning, especially in urban Southern California and will also make it more difficult for the state to achieve the requirements of AB32 and the renewable portfolio standard. This information is critical to utilities as they plan for system reliability and to local jurisdictions to minimize impacts of extreme heat on billpayers.
- Demand / Billpayer well being: A study by Professor Max Auffhammer from UC Berkeley has shown, at a local level, how increased temperature climate would affect electricity demand in the residential sector. This information together with information about socio-economic status is being analyzed to find options to reduce impacts to low income groups, the elderly, and other sensitive billpayer groups.
- Supply / Transmission: PIER research has shown that higher temperatures will lower the efficiency of thermal power plants and reduce the capacity of transmission lines. This information will allow utilities to plan well in advance and reduce billpayer's costs.

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[60] Pub. Util. Code, § 701.1, subds. (a) and (b).

- Transmission / Reliability: PIER research has shown that large wildfires will become more frequent in the rest of this century and that this would reduce the reliability of the electricity system. Maps have been created to show the transmission lines that are at greatest risk. This information will be used to minimize the risks of costly electrical interruptions in California for the benefit of electricity billpayers and promote forest watershed health and clean drinking water.
- Supply / Reliability: PIER research has shown that the timing of stream flows will shift to the early part of the year, reducing the amount of electricity that would be available from hydropower units to satisfy the summer peak demand periods. PIER supported modeling has shown, however, that some mitigation of this problem is feasible. For example, the use of probabilistic hydrologic forecasts and modern decision tools to manage large water reservoirs could accommodate some of these changes by reducing the energy penalties. More work is on-going.
- Demand / Supply / Reliability: The regional climate models that PIER has supported to develop climate scenarios for California that are adequate for both research and long-term planning are able to produce good forecasts of conditions in the summer about six months in advance. More work is underway to demonstrate how this capability could be useful to anticipate and solve potential problems with electricity supply in the summer peak season taking into account other factors such as snowpack conditions.
- Supply: PIER research on the Mojave ground squirrel and on birds and bats is producing information that can reduce conflict and their costs in the siting of solar and wind renewable energy facilities and transmission lines.
- Supply / Cost Containment: PIER research on salmon investigated the impacts of increased temperature and changes in hydrology on water and food conditions for salmon. This information will be critical for utilities in drafting permit conditions that minimize impacts on salmon in order to get approval by the Federal Energy Regulatory Commission for the 100+ hydropower units that will need to be re-licensed by FERC over the next decade in California.

- Billpayer Cost Containment: PIER has funded research on options to reduce billpayer costs for AB 32 compliance through mechanisms that could provide low cost allowances or offsets to energy utilities. For example:
  - In 2004, PIER completed a project evaluating the opportunity to increase carbon stocks in California via forest management or reforestation. Subsequently, ARB adopted an offset protocol for AB 32 based in part, on this work. PG&E and other utilities plan to use forestry projects to lower their AB 32 compliance costs and/or add some operational flexibility thus minimizing increased costs on billpayers.
  - PIER has also funded projects that found that California farmers could reduce greenhouse gas emissions, potentially creating low-cost offsets for utilities. This information could be used to develop a new offset protocol for the AB 32 program.

Research on the Impacts of Energy Use

The Joint Parties also recommend that the state continue to fund scientific research to analyze the impacts of our energy generation and consumption on the environment and billpayers.

Power plants contribute about 25 percent of the greenhouse gas emissions in California, and the energy sector as a whole (commercial, residential, transportation, industrial sectors, and electricity generation) contributes about 87 percent of state's greenhouse gas emissions. The state is morally obligated to understand the impacts of its energy use and to identify strategies to reduce the risk to billpayers from these impacts.

PIER research on the impacts of energy use and climate change is critically important for the state and other governmental agencies to develop strategies to reduce the risks to California billpayers from climate change–driven extreme events including fire, flood, sea level rise, drinking water disruption, and high heat. All of these impacts are affected by our energy use and impact the health and well-being of human communities and the natural resources upon which people depend. Research on the impacts of our energy production and consumption are vital in developing effective strategies to adapt to the unavoidable and accelerating impacts. The focus of the R&D program should be broad and consistent with the current PIER program.

OIR at p. 14, Question 13. *If R&D funding is continued, what are your suggested methods for ensuring and maximizing ratepayer benefits?*

The Joint Parties support CEC administration of research and development funds and recommend in Phase 1, the Commission authorize a continuation of current funding levels.

In Phase 2, the Joint Parties recommend the Commission support the creation of a long-term strategic plan to be developed by the CEC with the participation of the Advisory Committee, stakeholders and Commission staff. The development of a long-term strategic plan should set the research and development goals. This will help ensure that the short and long-term priorities established for the PIER program avoid duplication and maximize benefits for billpayers and California. The plan should define broad goals and options that would lead the state to achieve significantly reduced emissions from electricity and natural gas generation and consumption (or other key targets related to climate change) in a prescribed period of time with prescribed prospective performance metrics. The plan would serve as a long-term strategic plan to guide the development of the annual research and education agenda. Ideally, the Strategic Plan should identify and address climate-related issue areas including power generation and transportation. The plan should then be used to develop annual research projects.

A long term strategic plan for public interest energy research was recommended as early as 2005: The Independent Review Panel recommended in their report to the CEC to "[c]ontinue the development of a much-needed overall strategic plan (supported by an operations and procedural manual) that integrates the Public Interest Natural Gas Research program and links and strengthens the PIER program both within the CEC, with other state agencies, and with innovative national energy research initiatives."[61] The panel also found that on-going strategic planning activities should be established, stating that "[i]ndividual PIER program areas have strategic plans. However, there is no clearly articulated, integrated, agreed upon PIER Strategic Plan that states overall goals, sets specific objectives, establishes priorities, and describes a path forward for meeting

[61] CCST, 2005. p. 2.

California's future energy needs."[62] As a result, the CEC prepared the PIER 2007-2011 Electricity Research Investment Plan.[63]

Such planning is as relevant now as ever, as the PIER Advisory Board found when it supported a new strategic plan in its August 18, 2011 meeting. Public interest research is needed for a wide array of energy policy and technology challenges, and a clear strategy and prioritization will be crucial to maximize the effectiveness of the research program.

OIR at p. 14, Question 14. *Should this structure be open to the voluntary participation and contributions of publicly-owned utilities in California? If so, with what roles and financial contributions? Are there other models to ensure that ratepayers served by POUs are able to share in the gains of a state R&D function?*

The Joint Parties support creating an opportunity for voluntary participation and contribution of publicly-owned utilities, but recommends that the details of that participation be considered in Phase 2 of this proceeding.

OIR at p. 14, Question 15. *Are there any model approaches in other jurisdictions that could or should inform our consideration of future R&D funding structures and programs?*

California's long history of public investment in energy research and development is itself a model and should be considered in the Commission's reauthorization.

OIR at p. 14, Question 16. ***What suggestions do you have for increasing transparency and accountability in R&D program spending? How can costs be controlled or reduced, particularly in the administrative area?***

See the above responses to OIR at p. 13 Questions 7, 8, 10, 11, and OIR at p. 14 Question 13.

OIR at p. 14, Question 17. *Should there be an explicit role or set aside for utilities to invest in R&D, particularly in the areas of demonstration and deployment or commercialization activities? If so, for what explicit purposes, and what is the*

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[62] Id.
[63] CEC Staff Report, PIER 2007-2011 Electricty Research Investment Plan. Available at: http://www.energy.ca.gov/2006publications/CEC-500-2006-016/CEC-500-2006-016-D.PDF

appropriate level of funding? How would/should such a program be administered and overseen?

The Joint Parties do not recommend a utility set aside at this time. As discussed in Question 4, the Joint Parties support the ongoing administration of research and development funds at the CEC. To the extent that the utilities have requests or proposals for additional utility-administered research and development programs, they should be considered in Phase 2 of this proceeding or in the appropriate energy efficiency, long term procurement or renewable energy proceedings underway at the Commission.

OIR at p. 14, Question 18. *If utilities have a more explicit role in the future, are there competitiveness considerations that we should be concerned about? If so, please explain.*

The Joint Parties have no specific comments on competitiveness. In general, the Joint Parties support CEC administration of research and development funds. Also, see the above response to OIR at p. 13 Question 4.

OIR at p. 14, Question 19. *How should we coordinate any utility R&D program or expenditures in this context with similar requests that may be made in general rate cases?*

The Joint Parties recommend that any consideration of utility research and development programs be considered in Phase 2 of this proceeding. In Phase 2, the Joint Parties will support the development of a statewide strategic research plan to address electricity related research needs for global warming, technology development, and workforce development.

IV. CONCLUSION

The Joint Parties are appreciative of this opportunity to respond the questions set forth in the OIR. The Commission has broad ratemaking authority and is legally justified in authorizing the IOUs to continue funding the PGC and the energy R&D and renewable energy programs the PGC supports. In the interests of continuing the state's progress in renewable energy and renewable energy-related research and development, the Joint Parties strongly recommend that the Commission exercise its statutory authority to continue funding the PGC.

WHEREFORE, the Joint Parties respectfully request the Commission consider the above stated comments.

Respectfully Submitted,

_____/s/_____

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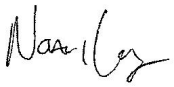
Director, California Climate Change

Dated: October 20, 2011

VERIFICATION BY DECLARATION

I, Noah Long, am a representative of Natural Resources Defense Council (NRDC). I am authorized to make this verification on behalf of this organization, and am making the verification because I am the lead representative in this proceeding and have unique personal knowledge of certain facts stated in the foregoing document.

Accordingly, under penalty of perjury, I hereby declare that I have read and reviewed the attached document, and that, to the best of my knowledge, information and belief, the information set forth therein is true and correct.



Noah Long October 20, 2011

VERIFICATION BY DECLARATION

I, *Laura Wisland*, am a representative of *Union of Concerned Scientists*. I am authorized to make this verification on behalf of this organization, and am making the verification because I am the lead representative in this proceeding and have unique personal knowledge of certain facts stated in the foregoing document.

Accordingly, under penalty of perjury, I hereby declare that I have read and reviewed the attached document, and that, to the best of my knowledge, information and belief, the information set forth therein is true and correct.

Laura Wisland, Senior Energy Analyst

October 20, 2011

VERIFICATION BY DECLARATION

I, Kelly M. Foley, am legal counsel for The Vote Solar Initiative. I am authorized to make this verification on behalf of this organization, and am making the verification because I am the lead representative in this proceeding and have unique personal knowledge of certain facts stated in the foregoing document.

Accordingly, under penalty of perjury, I hereby declare that I have read and reviewed the attached document, and that, to the best of my knowledge, information and belief, the information set forth therein is true and correct.

Kelly M Foley 10-20-2011

Kelly M. Foley Date

VERIFICATION BY DECLARATION

I, *Jim Metropulos*, am a representative of *Sierra Club California* . I am authorized to make this verification on behalf of this organization, and am making the verification because I am the lead representative in this proceeding and have unique personal knowledge of certain facts stated in the foregoing document.

Accordingly, under penalty of perjury, I hereby declare that I have read and reviewed the attached document, and that, to the best of my knowledge, information and belief, the information set forth therein is true and correct.

Jim Metropulos Date 10/20/2011

VERIFICATION BY DECLARATION

I, *Christopher Mertens* , am a representative of *The Californians for Clean Energy and Jobs* . I am authorized to make this verification on behalf of this organization, and am making the verification because I am the lead representative in this proceeding and have unique personal knowledge of certain facts stated in the foregoing document.

Accordingly, under penalty of perjury, I hereby declare that I have read and reviewed the attached document, and that, to the best of my knowledge, information and belief, the information set forth therein is true and correct.

Christopher Mertens 10/20/11
Date

VERIFICATION BY DECLARATION

I, Louis Blumberg, am a representative of The Nature Conservancy. I am authorized to make this verification on behalf of this organization, and am making the verification because I am the lead representative in this proceeding and have unique personal knowledge of certain facts stated in the foregoing document.

Accordingly, under penalty of perjury, I hereby declare that I have read and reviewed the attached document, and that, to the best of my knowledge, information and belief, the information set forth therein is true and correct.

Louis Blumberg 10-20-2011

Louis Blumberg