BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Integrate and Refine Procurement Policies and Consider Long-Term Procurement Planning.	Rulemaking 12-03-014 (Filed March 22, 2012)

OPENING TESTIMONY OF ENVIRONMENTAL DEFENSE FUND ON TRACK 4 OF THE LONG-TERM PROCUREMENT PLANNING DOCKET

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September 30, 2013

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I. INTRODUCTION

The Environmental Defense Fund ("EDF") respectfully submits the following Opening Testimony[1] regarding the Track 4 proceeding, which considers the long-term local capacity needs resulting from the closure of San Onofre Nuclear Power Station ("SONGS"), along with the loss of fossil fuel generation associated with implementation of once-through-cooling ("OTC") rules, to the California Public Utilities Commission ("Commission").

Testimony filed by the California Independent System Operator ("CAISO") on August 5, 2013, and by Southern California Edison Company ("SCE") and San Diego Gas and Electric Company ("SDG&E") on August 26, 2013, provide an informative set of data and analyses from which to examine potential pathways to ensure a reliable, sustainable and affordable energy future. EDF particularly commends SCE for advocating for a "Preferred Resources Scenario" that includes an innovative pilot and for clearly identifying the uncertain need for additional

[1] At the September 4, 2013 Pre-hearing Conference, Administrative Law Judge Gamson posed seven questions parties may consider including in their Opening Testimony. EDF addresses a number of the questions throughout its testimony and highlights the ALJ's questions in footnotes for reference.

(e.g., 500 MW) of resources. Likewise, EDF welcomes CAISO's cautious approach to over-procurement of fossil fuel resources, in calling for the Commission to refrain from rendering a decision until a comprehensive a set of analyses becomes available.

The closure of SONGS – along with the shuttering of the coastal area's aging, inefficient, gas-fired power plants – should serve as a historical marker, the event that signaled the end of one energy era, and the ushering in of a new customer-centric grid dominated by renewable electricity sources and flexible pricing approaches. SONGS' closure – a perhaps unintentional act of "creative destruction" – presents a unique opportunity for Southern California to advance towards greater integration of the state's preferred energy resources, particularly state-of-the-art energy efficiency, distributed generation, and a wide variety of de mand response resources, including robustly marketed time-of-use tariffs and automated "fast" DR that is fully visible to CAISO.

In addition to encouraging the Commission to establish robust goals for Preferred Resources, EDF echoes CAISO's recommendatio n that the Commission not rush to make a procurement decision in this proceeding.[2] There is no immediate need that requires procurement of fossil fuel resources and any plan to do so would be premature. Several significant reservoirs of Preferred Resources might be put into service within the needs-based time frame under consideration. It is of paramount importance to avoid potentially unnecessary, environmentally damaging and costly facilities that would become a part of the energy landscape for decades.

In 2002, on the heels of the California energy crisis, the legislature passed Assembly Bill 57, codified in California Public Utilities Code ("PU") 454.5, requiring the investor-owed utilities ("IOUs") to procure electricity and the Commission to review and adopt their long-term

[2] Track 4 *Testimony of Robert Sparks on Behalf of the California Independent System Operator Corporation*, R.12-03-014, pages 29-30.

procurement plans ("LTPP"). PU Code 454.5 requires that a number of parameters be met by both the IOU and the Commission for the LTPP to be approved. PU 454.5(b)(9)(C) requires:

> A showing that the procurement plan will achieve the following:
> The electrical corporation shall first meet its unmet resource needs through all available energy efficiency and demand reduction resources that are cost effective, reliable and feasible.

PU Code 454.5 requirements are also reflected in the *Energy Action Plan* ("EAP") adopted by the Commission, the California Energy Commission ("CEC"), and the California Power Authority in 2003. The goal of the EAP is to:

> Ensure that adequate, reliable, and reasonably-priced electrical power and natural gas supplies, including prudent reserves, are achieved and provided through policies, strategies, and actions that are cost-effective and environmentally sound for California's consumers and taxpayers.[3]

The EAP stipulates that the Commission "will carry out their energy-related duties and responsibilities based upon the information and analyses contained in the assessment:"[4]

> The *Action Plan* envisions a "loading order" of energy resources that will guide decisions made by the agencies jointly and singly. First, the agencies need to optimize all strategies for increasing conservation and energy efficiency so as to minimize increases in electricity and natural gas demand. Second, any need for new generation must be first addressed by renewable energy resources and distributed generation. Only after these two conditions are met, because the preferred resources require sufficient investment and adequate time to "get to scale," the commissions will procure additional clean, fossil fuel, central-station generation.[5]

In the 2005 EAP II, description of the loading order further illuminated the role of demand response:

> The loading order identifies energy efficiency and demand response as the State's preferred means of meeting growing energy needs. After cost-effective efficiency and demand response, we rely on renewable sources of power and distributed generation, such as combined heat and power applications. To the extent

[3] California Energy Action Plan, adopted 2003, p. 2.
[4] *Id.* at 3-4.
[5] *Id.* at 4.

> efficiency, demand response, renewable resources, and distributed generation are unable to satis fy increasing energy and capacity needs, we support clean and efficient fossil-fired generation.[6]

In 2008, the agencies adopted the *Update to the EAP,* in which the agencies reaffirmed California's commitment to "reducing greenhouse gas emissions." With this commitment as the backdrop, the updated EAP examined ways to increase the employment of the loading order's energy efficiency and demand response.[7]

Given clear guidance to "first meet unmet resource needs with energy efficiency and demand reduction resources that are cost effective, reliable and feasible," EDF is concerned that current proposals to manage a post-SONGS grid rely too heavily on non-preferred resources. As described in the EAP II, the onus is on those parties proposing non-preferred re sources to demonstrate, conclusively, that cost-effective and reliable Preferred Resources will not be adequate to ensure reliability.[8] Thus far, the IOUs' proposed reliability plans lean too heavily on non-preferred resources in the absence of transparent, well-vetted proof that Preferred Resources are insufficient to meet any estimated load gaps. Similarly, EDF understands that there may be need for resource investments to manage voltage, but the current Reliability Plan does not provide a clear explanation of those needs nor thorough consideration of how Preferred Resources might be cost-effectively and reliably used to meet them. Instead, policy makers should work with stakeholders to leverage this opportunity to move soundly towards California's policy-driven vision for a clean energy future.

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[6] Energy Action Plan II, adopted 2005, p. 2, http://docs.cpuc.ca.gov/word_pdf/REPORT/51604.pdf.

[7] California Updated Energy Action Plan, adopted 2008, p. 1, http://www.cpuc.ca.gov/NR/rdonlyres/58ADCD6A-7FE6-4B32-8C70-7C85CB31EBE7/0/2008_EAP_UPDATE.PDF

[8] ALJ Gamson's Question 1a asks, "*Does it matter which resources are procured or what the mix of the procurement is?"* As stated, state policy demands that Preferred Resources – e nergy efficiency (EE), demand response (DR), renewable sources and clean distributed generation – should be procured first. As demonstrated throughout EDF's testimony, these resources are more than capable of addressing potential gaps in SCE's service territory, and can likely address any gaps within SDG&E's service territory. In this respect the burden should be on the IOUs to demonstrate that Preferred Resources cannot be used to manage the grid in their service areas.

II. PURPOSE OF TESTIMONY

While a significant amount of analyses have been conducted examining how to best secure Southern California's energy future,[9] more needs to be done that takes into account action-oriented, quickly scalable pilots – before the Commission renders its ultimate decision about which resources, at what levels, should be deployed to address the gaps created by SONGS' closure and the OTC Plants.

In this Testimony,[10] EDF presents a contingency planning framework, as well as several near- and long-term solutions, to address SONGS' closure that we believe offer the preferred approach to securing the region's reliability needs in an environmentally prudent and economically beneficial manner. All of EDF's proposals center on the use of Preferred Resources,[11] particularly demand response ("DR"), and include time-variant pricing, demand-bidding programs, emergency load curtailment programs, and direct load control - to address potential grid needs in the timeframe presented by the power plant closures.[12]

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[9] See for example, *Preliminary Reliability Plan for LA Basin and San Diego*. Prepared by Staff of the California Public Utilities Commission, California Energy Commission, and California Independent System Operator DRAFT August 30, 2013

[10] Attachment A contains the Resumes of Steven Moss and James Fine.

[11] Preferred Resources are defined in the State's Energy Action Plan II as follows: "The Energy Action Plan supports a "loading order" of Preferred Resources to meet California's increasing energy needs. Energy efficiency and demand response are first, followed by renewable sources and clean distributed generation. To the extent that these efforts are unable to satisfy increasing energy and capacity needs, the state supports clean and efficient fossil-fired generation. Concurrently, electricity transmission infrastructure must be improved to support the development of renewable energy sources."

[12] ALJ Gamson's Question 4 asks, "*What is the appropriate timeline for resource procurement that should be considered in Track 4 (do certain resources need to come on sooner)?" Question 7 asks,* "If recommending preferred resources or storage to fill any need, it would be helpful to show how the attributes will meet LCR needs." As stated throughout EDF's Testimony, any additional procurement should be staged so that Preferred Resources are secured first, with fossil fuel-based resources viewed as contingency only. EDF's Testimony demonstrated that Preferred Resources exist that are cost-effective, reliable and feasible, as mandated by Public Utilities Code 454.5(b)(9)(C).

While EDF focuses on DR resources in this testimony, we fully support the use of a combination of Preferred Resources, including energy efficiency ("EE") and distributed generation. EDF is focusing on DR resources, with the understanding that other stakeholders, notably the Natural Resources Defense Council ("NRDC") and Sierra Club, will be providing comments about other Preferred Resources.

III. DISCUSSION

A. Decision Framework Should Match Extant and Emerging Conditions

Technology, public policies, economic conditions, and demographics have changed the energy management assets available to the Commission and ratepayers, the benefits they create, and the ease in which they can be adopted. In this proceeding, the Commission should be mindful of a few key factors, as follows:

- *It is increasingly difficult to site large-scale generation and transmission.* The era in which substantial generation and transmission projects and can be executed on time and within budget, or executed at all, is essentially over in California. In comparison to combustion resources, the siting of EE, DR, and distributed generation ("DG") are significantly less likely to face time delays and substantial obstacles to implementation. As noted by SCE, gas-fired generation ("GFG") and transmission projects face "…lengthy permitting and construction times…"[13] Similarly, SDG&E indicated that "…there is substantial uncertainty as to how quickly transmission projects can be licensed and built." [14] With the current energy outlook, using EE and DR to provide capacity and reliability support may better manage reliability risks than fossil fuel generation and development of large-scale transmission. At the same time, EDF

[13] SCE Testiomony, p. 47.
[14] Robert B. Anderson, *Prepared Direct Testimony of San Diego Gas and Electric Company*, August 26, 2013, page 2.

recognizes the synergistic benefit from continuing to develop DR and small-scale DG resources to meet CAISO's preferences and urges the Commission to support coordination efforts.

- *Plan to learn from and scale up "fast DR" pilot demonstrations.* EDF is working on a pilot project, the Demand Response Pilot Partnership, in collaboration with SCE, Lawrence Berkeley National Laboratory (LBNL) Demand Response Research Center, and US Green Building Council to demonstrate the ability of automated DR in large LEED-certified buildings to build reliable capacity. We are planning to expand this pilot by including more municipal buildings and coordinating with CAISO.
- *A diversity of resources better addresses reliability risks.* Preferred resources can provide more reliability and flexibility than combustion resources by harnessing diverse strategies that include automation, telemetry for small-scale DG and renewable fuel supplies. It is well known in financial markets that the best way to address risk is through a portfolio approach (e.g., invest in a diversity of vehicles). This is implicitly understood in energy planning, which is dominated by contingency strategies that focus on the loss of one or more resources. Procurement process and associated modeling should take the next step towards effectively incorporating the risk mitigation benefits of EE, DR, and DG as compared with large scale transmission and generation. For example, as many different resources replace one or two large resources in supplying energy and capacity, the use of "N-1" type modeling criteria will become less relevant.

- *Contingency planning should center on delivering preferred resources*.[15] Both SCE and SDG&E are seeking authorization to start procuring fossil fuel generation in case it is determined that such assets are needed as a result of further load analyses or the failure of Preferred Resources to deliver on their promise. To be consistent with the loading order and minimize unnecessary procurements, EDF recommends that contingency planning be based first on fully securing Preferred Resources through approaches that have been successful in California and other states, launch-ready pilots and adaptive management. We provide more detail about these strategies in the following discussion.

B. Near/Immediate-Term Solutions

In their testimonies, CAISO, SCE and SDG&E rightly incorporate preferred resources, including demand response, into their procurement strategies but can go further and be very successful. EDF believes that there are immediately available opportunities to expand implementation of DR (including automated-DR, dynamic pricing and other behavioral programs) in ways that fully address any lingering capacity gaps in both SCE's and SDG&E's service territories.

Demand response can provide ramping and peak demand energy resources. As stated in the CPUC's recently issued Order Instituting Rulemaking ("OIR") focusing on DR, "Load-following resources typically come from quick-start fossil-fueled generation plants; however, preferred resources, such as demand response, can also provide the needed reliability characteristics if designed properly."[16] There is ample room for both IOUs to increase the amount of energy and capacity secured through DR and other Preferred Resources beyond what

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[15] ALJ Gamson's Question 5 asks, "*Should there be any contingency plans if certain expected resources not occur in a timely manner i.e., what if gas fired plants are delayed, solar doesn't materialize?*" As stated, any contingency planning should first be based on securing Preferred Resources.

[16] CPUC, *Order Instituting Rulemaking to Enhance the Role of Demand Response in Meeting the State's Resource Planning Needs and Operational Requirements*, page 9.

is assumed in the Revised Scoping Memo and effectively address reliability concerns.[17,18] For example, they can:

(1) *Effectively Deploy Additional DR.* A recently published CPUC Staff Report found that in the summer of 2012 the IOUs "used their DR programs fewer times and hours than the programs' limits…In contrast, the Utilities dispatched their peaker power plants far more frequently in 2012 in comparison to 2006 – 2011 historical averages."[19] Although the Report also found flaws in current DR programs, these can be expeditiously addressed as part of the next round of initiatives, with ineffective programs and tactics dropped in favor of successful ones. As evidenced by the active role DR has played in other electric markets, program and market design have a dramatic impact on its utilization.

A recent experience in PJM demonstrates the value of both DR in meeting resource adequacy needs and DR as an active participant in markets with rules that treat resources comparably, including a forward centralized clearing auction to meet future reliability needs. Resources compete on a level playing field in PJM, where grid operators have avoided trying to make DR and other preferred resources comply with the unique characteristics of one particular type of generating technology. As is the case with CAISO, PJM operates a grid in which a variety of electricity providers including IOUs, municipal utilities, and rural electric co-operatives participate and successfully provide DR through a variety of procurement and market-based mechanisms. While we are not necessarily recommending that California adopt PJM's capacity market approach,

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[17] SCE, page 49.

[18] EDF also notes that there are significant amounts of cost-effective energy efficiency available that have not been accounted for in the analyses presented in this proceeding to date. This additional EE could displace the need for more than 1,300 MW of new capacity in 2022, according to the Natural Resources Defense Council. CAISO's energy efficiency estimate of 2,300 MW is based on the first draft of a CPUC study that was released in March 2013. However, that study did not analyze future state and federal energy efficiency codes and standards. The most recent draft of the CPUC potential study includes some additional codes and standards, with significant increases in energy efficiency penetration.

[19] Seewww.cpuc.ca.gov/NR/rdonlyres/523B9D94ABC4-4AF6-AA09-DD9ED8C81AAD/0/StaffReport_2012DRLessonsLearned.pdfpage 1.

the integral role that DR is playing in the northeast demonstrates that it can play a significant role in meeting the needs of the grid within a supportive regulatory construct.

During the week of September 10th, normally a shoulder period in PJM, unexpectedly high temperatures led demand to spike at 10% over the previous September peak. In spite of a number of generation facilities being offline for typical seasonal maintenance,[20] operators were able to meet system demand through the use of DR procured in the forward capacity market. PJM's capacity market has been successful in attracting new capacity, including demand response resources, which provided approximately 6,000 MW of demand response during this emergency. According to PJM officials, "Generation performance and demand response played significant roles in balancing the supply and demand on the grid during unusual conditions this week," and "PJM continues to see the value and success of demand response participating in PJM markets."[21] Further, a recent study of DR in the northeastern U.S. by Synapse Energy Economics found that DR can both perform reliably and can contribute directly to resource adequacy.[22]

Equally important as an electric market design that takes advantage of different resource characteristics is a design that rewards performance. In most successful cases the development of DR resources has benefitted from a well-balanced combination of long-term contracts for procurement and shorter-term, market-based performance incentives. The authors of the Synapse study noted that while markets have an important role to play, markets alone may not recruit an economically efficient level of DR.

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[20] http://www.reuters.com/article/2013/09/11/utilities-pjm-demand-idUSL2N0H72L920130911

[21] http://www.pjm.com/~/media/about-pjm/newsroom/2013-releases/20130912-pjm-meets-high-electricity-demand-during-unusual-heat-wave.ashx

[22] http://www.synapse-energy.com/Downloads/SynapseReport.2013.03.RAP.US-Demand-Response.12-080.pdf

Further, "integrating demand response into wholesale markets that are clearly designed with central station power plants in mind has proved difficult and complicated."

In this vein, the utilities should be incented to produce DR programs that are consistently relied upon, meet CAISO criteria for reliability, and meet emerging needs, including altering the timing and length of when DR can be called upon and providing persistent price signals through tariffs. DR Resources can be treated in a similar fashion as generation and transmission: the utilities should issue procurement requests that specify what is needed, when, where, and at what levels, and enable the market to respond with proposals. Additionally, direct participation in markets by demand response providers is key to leveraging both the utility procurement process and market forces to drive more effective development and use of DR resources.

(2) *Expanding and Improving Flex Alert*. The Flex Alert program has demonstrated a cost-effective ability to close short-term reliability gaps. And evidence suggests that even greater amounts of MWs can be squeezed out of the next generation of behavioral programs. For example, according to the CAISO,[23]

> Based on historical experience, the ISO estimates that this [Flex Alert] important operational tool can generate substantial numbers on the order of magnitude of 1,000 megawatts, although recent survey results by SCE indicate conservation levels may have been much higher. SCE has noted in its recent testimony in support of its *Application for Demand Response* program augmentation that "[r]esults from SCE's 2012 Summer Readiness Effectiveness Study indicate a favorable outcome for the Flex Alert effort. Nearly 60% of residential customers reported hearing or seeing Flex Alert advertisements (65% within Orange County), and 54% of small business customers (54% within Orange County). Furthermore, one quarter of residential customers reported that they took steps to

[23] *Comments of the California Independent System Operator Corporation*, California Public Utilities Commission, Application of Pacific Gas and Electric Company for Approval of 2013 – 2014 Statewide Marketing, Education, and Outreach Program and Budget (U39M) Application 12-08-007 (filed August 3, 2012) And Related Matters, February 1, 2013.

reduce electricity on a Flex Alert day (31% within Orange County), [24] and similarly with 21% small business 10 customers (36% within Orange County)."[25] This level of conservation equates to the output of two large power plants.

During high temperatures in 2012 SCE was able to balance electricity supply and demand, in part, by relying on Flex Alerts, which reduced demand by almost five percent when triggered.[26] EDF recommends further improving Flex Alert – by expanding the use of social and other media to reach more consumers, for example – to increase the amount of temporary load the program can reliably deliver. This would be particularly appropriate to address supply gaps that could occur during very low-probability events, such as the simultaneous loss of a major generation facility and transmission line.

(3) Promote Voluntary Time of Use Rates (TOU) to meet specific penetration goals. In Southern California Edison's service territory, EDF estimates that if just 20 percent of ratepayers adopted the existing voluntary TOU rate peak demand would fall by almost 630 MW, more than enough to address that utility's uncertain need for 500 MW. If half of Edison's ratepayers adopted the TOU tariff, almost 1,600 MW of peak demand would be avoided, or two-thirds of SONGS capacity.

TOU rates provide an infrastructure-ready, extremely cost-effective peak management resource that, with the right incentives, can be ramped-up quickly.

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[24] See also Cal-ISO press release: "Conservation, Teamwork and Planning Helped California Grid Weather the Historic Heat Wave of July 2006," at http://www.caiso.com/Documents/Conservation_TeamworkandPlanningHelpedCaliforniaGridWeatherHistoricHeatWave-July2006.pdf

[25] *Testimony of Southern California Edison Company in Support of its Application for Approval of Program Improvements and Augmentations to its Existing Demand Response Program Portfolio for the Summers of 2013 and 2014, Testimony of K. Wood, SCE Response to Q.2 at* p. 61 lines 4-10, (A.12-12-07 and A12-12-06). Accessible on Edison's website at http://www3.sce.com/sscc/law/dis/dbattach11.nsf/0/651FB78E9E1AC2DD88257AE300086C08/$FILE/A.12-12-017_+SCEs+2013-2014+DR+App+-+SCE-01+Testimony+in+Support+of+App+for+Addtl+DR+for+2013+and+2014.pdf

[26] Eric Wollf, "ENERGY: Locals Respond to Energy Conservation Request, Slice Peak Load by 1.4 Percent, *North County Times*, August 19, 2012.

Currently, adoption rates for these tariffs are modest in both of the IOU's service territories. However, better design and promotion of time-variant tariffs – such as those used successfully in Arizona and for resources through procurement processes – could result in a significant reshaping of system peaks, substantially reducing the need for peaking resources.

(4) *Fast-Track Existing Pilots and Their Expansion when Demonstrated to be Effective*. EDF supports SCE's Preferred Resources Living Pilot Program as a means to demonstrate that Preferred Resources can be effectively deployed as part of resource planning and to mitigate transmission contingencies. In addition, a number of pilots have been proposed in other CPUC proceedings which, if successful, could quickly increase the capacity of DR programs to fill emerging load gaps. For example, three DR pilots are being considered in the DR OIR, two of which will test the ability of DR to participate in CAISO's wholesale energy market – specifically focusing on providing additional DR capacity in Southern California – and another which will examine the effectiveness of strategies to improve customer response to TOU and critical peak pricing rates.[27]

As much as possible, EDF encourages the Commission to view these pilots as "soft launches" as opposed to experiments designed solely to yield data. In other words, as in the high-technology sectors, rather than being seen as "contributing to the literature" DR and SCE's Preferred Resource pilots intended to address Southern California's supply gaps should be designed for immediate scalability if they meet certain criteria

[27] CPUC, *Order Instituting Rulemaking to Enhance the Role of Demand Response in Meeting the State's Resource Planning Needs and Operational Requirements*, page 17.

(e.g., cost-effectiveness). This approach is a better way to address contingencies than fall-back reliance on fossil fuel generation.

While EDF supports the concept of an energy park in SDG&E's service territory, we recommend that it be a clean one, rather than relying strictly on fossil fuels. EDF is puzzled why the energy park plan presupposes that Preferred Resources would not be located in the yet to-be-determined site. The presumption is inconsistent with careful contingency planning and the state's determined effort to bring Preferred Resources to the table first. As well, there is already a history of demonstrating site-specific deployment of Preferred Resources at Camp Pendleton.[28]

(5) *Extending OTC closure schedule.* EDF supports the notion of temporarily delaying plant closures due to OTC rules as a better solution than building more combustion resources that will last for multiple decades but are only justified by short-term capacity needs. While EDF understands that OTC resources may be less efficient and more polluting than new facilities, a short delay in their closure is preferable to extensive new investments in combustion resources that would keep California from its preferred course for decades.

In discussing the opportunities above, EDF does not imply that additional steps are not available or warranted. Other short-term solutions, such as fast-tracked energy efficiency procurement and replacement of fossil back-up generators with storage, networked into the grid, should also be considered.[29]

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[28] Camp Pendleton installed photovoltaic systems in an unused landfill in 2011 and at two dining facilities in April 2013. In addition, the CEC provided $1.7 million for a microgrid technology research demonstration project at Camp Pendleton, one of several projects commission funded microgrid demonstrations at US military installations). See http://www.energy.ca.gov/releases/2013_releases/2013-07-08_military_microgrid_nr.html

[29] ALJ Gamson's Question 3 asks, "*Are there any other updates to the assumptions that should be considered i.e., from demand response, energy efficiency and energy storage?*" As discussed in EDF's testimony in this proceeding, as well as in these comments, assumptions related to additional DR – as well as EE and storage – should be updated.

C. Longer-Term Solutions

For long-term solutions, the CPUC should consider several strategies:

- Implementation of smart grid-enabled efficiency and grid management strategies, such as voltage conservation. For example, EDF recommends that both SCE and SDG&E, as part of its distribution system studies, undertake a feeder-by-feeder voltage optimization study to determine the potential of energy savings through Volt/VAR control efforts. Volt/VAR Control is the control of voltage levels between the electric utility substation and the customer meter that reduces line losses and achieves overall voltage reduction, thus reducing energy consumption for the customer and achieving several benefits for the utility. Virginia Dominion, AEP, Duke and several other utilities have demonstrated savings in the 2-3% range using capacitor banks, voltage regulators and other smart grid equipment to achieve voltage optimization.

  If the studies find taking such measures is appropriate, EDF recommends that using a pilot to fully explore the availability of voltage reduction. This pilot should inform future deployments as soon as practicable.
- Deploy pricing signaling strategies, such as automated DR and time-variant tariffs.
- Further implement automated DR and price-responsive DR, continuing to refine and, as appropriate, expand policies and programs.

D. Commission Should Avoid Prematurely Authorizing Fossil Fuel Procurement

As discussed in CAISO's, SDG&E's, and SCE's testimonies, significant uncertainty is associated with the need for additional resources to be authorized in this proceeding. For example, some SCE study scenarios "…show that no new generation is needed to meet NERC

In particular, better deployment of voluntary time of use (TOU) rates could result in a significant reshaping of system peaks, substantially reducing the need for peaking resources.

Reliability Standards."[30] Likewise, the utility has stated that its model results indicate that it does not need any *additional* conventional generation to meet reliability, showing a requirement of 1,055 MW in the LA Basin and 1,200 MW of recently authorized generation.[31] There are many options to meet reliability requirements, not all of which have been yet considered in this proceeding.[32]

The Commission should not rush to authorize new conventional resources. Rather, this proceeding should be used to fully assess all the various options to meet long-term procurement needs and reliability requirements.

IV. CONCLUSION

EDF thanks the Commission for this opportunity to comment on the Long Term Procurement Plan. The closure of SONGS and the planned closures of the OTC plants have put California at a crossroads, with the opportunity to make decisions now and impact our energy future for decades to come. EDF concludes and strongly recommends the Commission utilize preferred resources, including demand response and other options outlined above, to address the needs created by the closure of SONGS.

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[30] Garry Chin, et.al. *Track 4 Testimony of Southern California Edison Company*, page 6.

[31] In SCE's LTPP opening testimony, Figure II-2, titled "Results of SCE's Studies," shows 1,055 MW of New LA Basin Generation needs, but 1,200 MW of Track 1 New Conventional Generation Authorizations, which more than meets that local need. SCE, *Track 4 Testimony of Southern California Edison Company*, CPUC Long Term Procurement Plan proceeding, R.12-03-014, p. 3 (August 26, 2013)

[32] "The development of Mesa Loop-In and the strategically located Preferred Resources could displace the need for any additional new LCR resources, while still meeting NERC Reliability Standards." *SCE LTPP Opening Testimony* at 3.

Respectfully signed and submitted on September 30, 2013

ENVIRONMENTAL DEFENSE FUND

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Attachment A

STEVEN J. MOSS

PROFESSIONAL EXPERIENCE

Mr. Moss has participated in multiple initiatives focusing on a variety of energy and water issues. He has led efforts to reduce electricity costs, and provide better pricing options, on behalf of agricultural, commercial, and residential ratepayers; estimated the economic benefits associated with investments in energy-related research and development; examined the environmental impacts associated with various uses of energy, including in transportation. He is currently examining the benefits and costs associated with distributed energy resources; and managing a program to increase water conservation among low income and small business populations.

REPRESENTATIVE CLIENTS

Agricultural Energy Consumers Association, American Farmland Trust, Bank of America, California Air Resources Board, California Energy Commission, California Farm Bureau Federation, California Public Utilities Commission, California Truckers Association, Consulting Engineers and Licensed Surveyors of California, Environmental Defense Fund, Los Angeles County Sanitation Districts, Natural Gas Vehicle Coalition, Rail Watch, Reason Foundation, Redefining Progress, Southern California Gas Company, Western Manufactured Home Parks Association, Western States Petroleum Association.

ACADEMIC ACHIEVEMENTS

- Fulbright Indo-American Environmental Leader Fellowship, 2004.
- Salzburg Seminar Fellow, 2001.
- Kellogg National Leadership Fellow, 1997-2000.
- Presidential Management Intern, 1985 – 1987.
- Masters of Science, Public Policy, University of Michigan, Ann Arbor, 1985.
- Bachelors of Science, Conservation of Natural Resources, University of California, Berkeley, 1982.
- Lyndon B. Johnson Congressional Scholar, 1981.

PROFESSIONAL EMPLOYMENT AND DEVELOPMENT

- Budget Advisor, Office of Technical Assistance, U.S. Treasury Department, 2006-present.
- Publisher, *Potrero View*, 2006-present.
- Supervisor's Appointee, Potrero Power Plant Citizen's Task Force, 2001-Present.
- Executive Director, San Francisco Community Power, 2001-Present.
- Governor's Appointee, California Inspection and Maintenance (Smog Check II) Review Committee, 1997 - 2001.
- Partner, M.Cubed, 1993 – Present.

- Senior Economist, Foster Associates, 1987-1993.
- Adjunct Lecturer in Environmental Economics, California History, Public Policy Analysis, Golden State University, San Francisco State University, San Quentin State Prison, 1997 - 2006.
- Congressional Staff, U.S. House of Representatives, 1987.
- Budget Examiner, U.S. Office of Management and Budget, 1985 - 1987.

REPRESENTATIVE PUBLICATIONS

Distributed Energy Resource Implementation: Testing Effective Load Management at the Feeder Level, Draft Interim Report, published by the California Energy Commission, Winter, 2007; *Statewide Pricing Pilot: Track B Evaluation of Community-Based Information Treatment*, published by California Public Utilities Commission, Fall, 2005; "Community- Based Trading Mechanisms to Reduce Polluting Air Emissions and Address Global Warming," *Journal of Environmental Assessment, Policy, and Management*, June 1999; "The Use of Demographic and Economic Forecasts in Air Quality Policymaking," *Environmental Regulation and Permitting*, Spring 1998; *Economic Analysis of the Proposed 1994 State Implementation Plan Conducted Prior to its Consideration by the California Air Resources Board*, published by the Cal-EPA February 1996.

SELECTED PROJECTS

- **High Efficiency Toilets Direct Installation Program, San Francisco Public Utility Commission (2008-2009).** Led program to train a diverse team of San Franciscans to provide water conservation audits, and identify water-wasting toilets to be replaced with water wise one, at low income households and small businesses.
- **Distributed Energy Resources "Test Bed" Project, California Energy Commission, (2004-2008).** Examined DER's impact on two distribution feeder lines to determine benefits and costs from utility, ratepayer, and societal perspectives. Project included developing and implementing energy efficiency and demand-response programs and technologies targeted at small and medium commercial energy users.
- **Statewide Pricing Pilot, Track B Analysis, California Public Utilities Commission (2003-2005)** Developed experimental program to examine whether providing educational "treatments" communicated through a community-based organization in an environmentally-impacted neighborhood enhanced responses to critical peak pricing among residential energy users. The project included survey and econometric research.
- **San Francisco Community Power, City and County of San Francisco (2001-present).** Launched San Francisco Community Power in Southeast San Francisco. The organization's objectives included assisting small businesses and low income residences to better manage their energy use, thereby generating environmental and economic benefits; training community residents to install and distribute energy-saving measures; providing technical assistance on energy-related issues to community groups and policy makers; and producing high-quality news and information about environmental issues to San Francisco residents.
- **Agricultural Rate Setting Testimony, Agricultural Energy Consumers Association (1992-present).**
  Testified about agricultural economic issues related to energy use, linkage to California water management policy, and utility rates in numerous proceedings at the California Public Utilities Commission, California Energy Commission, and California State Legislature. Analyzed various aspects of electric industry restructuring; proposed innovative pricing options; examined marginal cost principles and applications, and testified in a large number of energy related hearings.

Developed innovative rate allocation methodology that incorporated regional marginal costs and value of service planning based on the Pacific Gas and Electric Co. Area Cost Study. Agricultural rates increases as a result were held to less than half of the initial rate request. Presented testimony in Southern California Edison electric rate hearings on agricultural rates, with an emphasis on the ability of agricultural customers to bypass electricity for pumping needs. SCE responded with a bypass rate alternative for agriculture. Presented testimony in Southern California Gas Company rate proceedings on design of agricultural rates and calculation of gas storage costs.

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EDUCATION

Energy and Resources Group, University of California, Berkeley, CA

- Ph. D. in Energy and Resources, May 2003
  Dissertation: *The Ends of Uncertainty: Air Quality Science and Planning in California's Central Valley*
  An interdisciplinary case study describing and critiquing the application of regional photochemical air quality simulation modeling to meet health-based tropospheric ozone standards. Identified regulatory requirements, scientific and policy debates, social networks and narratives, and modeling utilization, and then critiqued the planning process with theory and experience using theory and experience from air quality engineering, economics, decision and policy sciences, consensus-based planning, and modeling.

- M. S. in Energy and Resources, May 1998
  Thesis: *Using Tradable Particulate Emissions Permits to Improve Air Quality in California's Central Valley*
  Evaluated the feasibility of using a tradable emissions permit program to reduce ambient particulate matter concentrations using regulatory, economic and social justice criteria and considering lessons from the implementation of tradable discharge permit programs to improve water quality.

Wharton School of Business, University of Pennsylvania, Philadelphia, PA

- B. S. in Economics, May 1989

PROFESSIONAL EXPERIENCE

ENVIRONMENTAL DEFENSE FUND **2007 - Present**

Energy and Climate Change Economics and Policy

- Representing environmental goals in the state climate legislation and regulation development
- Developing policy to achieve global climate stabilization and local environmental justice

INDEPENDENT CONTRACTOR, ENVAIR & M.CUBED **1994 - 2007**

Energy Economics Modeling

- Compared the costs of decommissioning or relicensing the Klamath Dam complex.
- Forecasted energy demand and production/delivery capacity for the City of San Francisco.

Air Quality and Transportation

- Analyzed the costs incurred by the construction industry to comply with the off-road diesel vehicle emissions reduction rule proposed by the California Air Resources Board.
- Calculated public revenues and expenditures associated with surface transportation (state highways, local roadways, mass transit service) in the six counties encompassing Chicago.
- Evaluated the feasibility of identifying the influence of variable biogenic VOC emissions on tropospheric ozone formation in the San Francisco Bay Area
- Wrote a technical report about nitrogen oxides pollution that surveys existing legislation and regulation, analyzes issues that may lead to further emissions controls, lists emissions sources, and identifies future research needs
- Conducted research for an economic impact analysis of the California Air Resources Board's State Implementation Plan for attainment of national ambient air quality standards

Water Quality and Water Rights Economics

- Evaluated the potential for implementing a tradable discharge permit program to reduce nonpoint sources of water pollution in the Oregon's Deschutes River Basin
- Estimated the fair market value of a farmer's water right to facilitate its acquisition by federal agents to augment river flows for fish habitat

UNIVERSITY OF SAN FRANCISCO, Dept Env. Science & Studies **2003 - Present**

- Teach graduate courses in the Masters of Science in Environmental Management program
- Teach undergraduate courses in the Environmental Science and Environmental Studies majors
- Oversee and advise graduate students' research

WEST OAKLAND ENV. INDICATORS PROJECT, Coordinating Team **2005- Present**

- Coordinating Team Member
- Co Chairing (with EPA) of West Oakland Toxics Reduction Collaborative Alternative Fuels Team
- Cal-EPA grantee to service as Technical Advisor to West Oakland community in goods movement planning

CUMULATIVE AIR RISK EVALUATION COMMUNITY TASK FORCE **2005- Present**

- Member of Task Force convened by the Bay Area Air Quality Management District
- Conducting community-based participatory research on diesel particulate emissions in West Oakland to inform the second phase of the BAAQMD's toxic air contaminate emissions estimates. USF students are conducting research on questions posed by community members about the CARE study. Research topics include truck driver socioeconomic survey, truck traffic activity observations, and forecasting construction-related emissions.

LAWRENCE BERKELEY NATIONAL LAB, Atmospheric Sciences Program **1999 - 2003**

Ozone Air Quality Modeling and Planning

- As part of dissertation research, reviewed methods to estimate photochemical air quality simulation model uncertainties and evaluated the potential utility of uncertainty information for use in policy-making. Interviewed agency planners, modeling technicians, and stakeholder representatives to describe modeling practice and document an air quality planning process for California's San Joaquin Valley

LSA ASSOCIATES, INC., Resource Policy and Economics Group **1991 - 1994**

Fiscal and Economic Impacts

- Compared fiscal impacts of six land use alternatives for redevelopment of a blighted portion of the City of Orange.
- Analyzed the fiscal impacts to the Town of Colma of proposed annexation and subsequent development of a 52-acre area of San Mateo County, which included a BART station.
- Performed a fiscal impact analysis of a 800-unit development in Alameda County.
- Calculated the economic impacts associated with development of commercial, industrial, hospitality and golf uses on a 1,900-acre parcel near the Sacramento Airport.
- Analyzed the economic impacts of changing natural resource management policies.
- Performed socioeconomic, cost effectiveness, public services, land use, and air quality impact analyses to satisfy state (CEQA) and federal (NEPA) requirements for environmental review

PUBLICATIONS

- Motsinger, J., Moss, S. and J. Fine. 2010. A Gold Standard for Equity in Climate Cap-and-Trade Programs. Environment Magazine. V54:(July/Aug): 35-43.
- Fine, J. and D. Owen. 2005. Technocracy and Democracy: Technocracy and Democracy: Conflicts between Models and Participation in Environmental Law and Planning. Hastings Law Journal V56(May):900-981.
- Fine, J., L. Vuilleumier, S. Reynolds, P. Roth, and N. Brown. 2003. Evaluating Uncertainties in Regional Photochemical Air Quality Modeling. Annual Review of Environmental and Resources V28 (Nov. 2003)
- Roth, P.M, S.D. Ziman, and J.D. Fine. 1993. Tropospheric Ozone. Keeping Pace With Science and Engineering: Case Studies In Environmental Regulation. National Academy Of Engineering Washington D.C.

REPORTS

Shock Proofing Society: How California's Global Warming Solutions Act (AB 32) Reduces the Economic Pain of Energy Price Shocks. Authors: J. Fine, C. Busch and R. Garderet. Environmental Defense Fund, Center for Resource Solutions and Energy Independence Now. September 2010.

Securing a Gold Standard for Equity: Methods for Crediting Residential and Small Business Emissions Reductions in Carbon Markets. Authors: J. Fine, S. Moss and J. Motsinger. Environmental Defense Fund and San Francisco Community Power. April 2010.

Left to Our Own Devices: Financing Efficiency For Small Businesses And Low-Income Families. 2010. Authors: S. Moss and J. Fine. Environmental Defense Fund. January, 2010.

Economic Modeling of Relicensing and Decommissioning Options for the Klamath Basin Hydroelectric Project. 2006. Prepared for California Energy Commission in association with M.Cubed. CEC-700-2006-10

Calculating Off-Grid Terrestrial Greenhouse Gas Emission Reductions. 2004. Prepared for Environmental Defense.

The Economic Benefits of Treasure Island Wetlands. 2002. Prepared for Treasure Island Wetlands Project.

Evaluation of Technical Questions Associated with Using the SNTemp Model to Study Temperature in the Burnt River, Oregon. 1998. Prepared for Environmental Defense Fund.

Evaluating The Potential For Implementing A Tradable Discharge Permit Program in the Deschutes Drainage Basin 1997. Prepared for Environmental Defense Fund and Deschutes Basin Resources Conservancy

Estimation of the Fair Market Value of a Water Storage Contract Proposed for Sale to the United States. Memo Report. 1997. Prepared for Environmental Defense Fund.

Spatial Representativeness of Monitoring Sites and Zones of Influence of Emissions Sources. 1998. California Regional Particulate Air Quality Study 1995 Integrated Monitoring Study Data Analysis. Prepared for the San Joaquin Valleywide Air Pollution Study Agency.

San Joaquin Valley Source Signature Scoping Study Initial Phase Findings Report. 1996. Prepared for the San Joaquin Valley Air Pollution Study Agency Technical Advisory Committee.

Feasibility of Identifying the Influence of Biogenic Emissions on Air Quality in the San Francisco Bay Area. 1996. Prepared for the Western States Petroleum Association and the Bay Area Air Quality Management District.

Felling the Myth: The Role of Timber in the Economy of California's Sierra Nevada. 1995. Prepared for the Natural Resources Defense Council.

The Potential for Further Regulation of Nitrogen Oxides Emissions. 1995. Prepared for the Coerr Envir. Corp.

Public Finance of Surface Transportation in the Chicago Metropolitan Area During 1990. 1995. Prepared for the Environmental Defense Fund.

Northwest Orange Land Use Alternatives Fiscal Impact Analysis. 1994. Prepared for the City of Orange Community Development Department.

Cost Effectiveness Analyses for the Environmental Assessments of the Moss Landing Marine Laboratory and Watsonville Community Hospital Relocations. 1994. Prepared for the Federal Emergency Management Agency.

Clean Water Act Section 404(b)(1) Alternatives Analysis for the Gelsar Property. 1994. Prepared for Gelsar and the U.S. Army Corps of Engineers.

An Economic Profile and Analysis of the Relative Importance of Mining in the California Desert Conservation Region. 1993. Prepared for The Wilderness Society.

Native Monterey Pine Forest Inventory and Sustainability Evaluation. 1993. Prepared for the Pebble Beach Company Real Estate Division.

A Review of Selected Multi-Resource Forest Planning Models. 1993. Prepared for The Pacific Forest Trust.

Socioeconomic Impact Analysis for the Environmental Assessment of the proposed Natural Gas Line Number 6902. 1993. Prepared for The Gas Company.

Mitigation Monitoring and Financial Assurance Programs for the Forward Inc. Landfill Use Permit and Modification Environmental Impact Report. 1993. Prepared for the San Joaquin County Community Development Department.

Robert's Landing Residential Development Fiscal Impact Analysis. 1992. Prepared for the City of San Leandro Planning and Building Department.

Socioeconomic Impact Analysis for the Environmental Impact Report on the proposed Anaheim Enterprise Zone. 1992. Prepared for the City of Anaheim.

Colma BART Study Area Fiscal Impact Analysis. 1992. Prepared for the Town of Colma.

Metro Air Park Development Economic Impacts Assessment. 1992. Prepared for The O'Connell Corporation.