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BEFORE THE PUBLIC UTILITIES COMMISSION OF THE

STATE OF CALIFORNIA

Order Instituting Rulemaking to Consider Smart Grid Technologies Pursuant to Federal Legislation and on the Commission's own Motion to Actively Guide Policy in California's Development of a Smart Grid System.	Rulemaking 08-12-009 (Filed December 18, 2008)

REPLY COMMENTS OF ENVIRONMENTAL DEFENSE FUND ON PROPOSED POLICIES AND FINDINGS PERTAINING TO THE SMART GRID

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I. INTRODUCTION

Environmental Defense Fund (EDF) appreciates the opportunity to comment on the Joint Ruling Amending Scoping Memo and Inviting Comments and Proposed Policies and Findings Pertaining to the Smart Grid. EDF is a leading national nonprofit environmental advocacy organization representing more than 700,000 members across the country, including more than 100,000 in California. These comments draw on the experience gained to date through our active participation in the Pecan Street Partnership (PSP), a pilot for smart grid technology and related business models to enable the City of Austin to achieve aggressive renewable energy, energy efficiency, and other environmental goals.[1] On March 24th, 2010, the PSP participants released a

[1] More information about the Pecan Street Project, a collaboration of EDF, Austin Energy, the Austin Chamber of Commerce, the University of Texas and the City of Austin can be found at PecanStreetProject.org. EDF's role in the project includes managing collaboration with leading technology companies including Cisco, Dell, Gridpoint, IBM, and Microsoft, and developing the environmental performance goals and metrics.

report of recommendations for transforming electricity delivery into a customer-focused clean energy system, which we submit as Attachment A.[2]

EDF's work on PSP and our review of the other parties' comments reinforce our belief that the CPUC needs to make achievement of specific and measurable environmental benefits a clear objective of smart grid deployment in California. California's many progressive environmental policy initiatives – The Global Warming Solutions Act (AB 32), the Renewable Portfolio Standard (RPS), building and appliance efficiency standards, the loading order, and air quality (including toxics) policies provide the context of SB 17 and are explicitly required to be evaluated under SB 17's §8366. Our approach in the Pecan Street Project is to design smart grid deployment in Austin to maximize the measurable environmental benefits that can be achieved with a more flexible, efficient, and information-rich grid. The CPUC should require utilities to do the same by setting clear environmental goals and evaluating the result with appropriate metrics. By having clear environmental goals and strategy to integrate third party systems and services, renewables, demand response, storage, electric vehicles, and distributed generation, ratepayers will get more out of smart grid investments.

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[2] *Available at* http://pecanstreetprojectaustin.org/wp-content/uploads/2010/03/Pecan_Street_Final_Report_March_2010.pdf.

II. LEGAL AND POLICY BACKGROUND: SMART GRIDS AND ENERGY-RELATED ENVIRONMENTAL BENEFITS

A. The California Legislature wants the Smart Grid Designed to Maximize Environmental Benefits

As we stated in our March 9th comments, California's history of developing progressive, and mutually reinforcing environmental policies is well-suited to realizing the environmental promise of smart grid technology. Done right, a smart grid provides the necessary foundation to facilitate deployment at scale of clean, efficient, and low carbon energy technologies and strategies. The state's legislature and energy agencies have in fact made clear that a prime motivation for deploying smart grid technologies is to help meet the state's ambitious environmental goals. We gave detailed legal and policy background of SB 17 in our March 9th comments, and only briefly summarize them here.

As indicated by section 8360 and 8366 of SB 17, the deployment plans should enable the state's clearly defined energy policies. SB 17 specifically includes the Global Warming Solutions Act of 2006 (AB 32), the 33% RPS,[3] energy efficiency standards, and demand response targets. It also asks the CPUC to evaluate the smart grid for its ability to reduce overall system impacts on the environment, which would include California's ability to meet the Federal Clean Air Act and laws on toxic pollutants. A much more detailed version of the energy and environmental requirements of SB 17 can be found in our Opening Comments.

B. The Smart Grid is a Critical Enabler of All of California's Major Energy Policies

[3] CA. GOVERNOR'S EXEC. ORDERS NO. S-14-08 (Nov. 17, 2008) and S-21-09 (Sept. 15, 2009) set the requirement that sellers of electricity reach 33% RPS by 2020 and require CARB to adopt regulations to implement this requirement.

The smart grid is vital to achievement of California's energy and environmental policies. Indeed, the California Independent System Operator (CalISO) states that two main objectives it sees for smart grid deployment in California are to "increase participation in ISO markets from demand-side and other distributed energy resources" and to "enable the integration of greater amounts of intermittent renewable resources."[4] EDF agrees with CalISO and offers below some specific examples of how smart grids can help us to meet California's many progressive environmental and energy policy goals. These examples should not be read as an exhaustive list of smart grid's environmental potentials, nor be taken as a substitute for a comprehensive environmental plan for statewide smart grid deployment.

1. Climate Change: The Global Warming Solutions Act of 2006 (AB 32):

AB 32's Scoping Plan directly accounts for the state's existing and planned policies for energy efficiency (including both standards and utility programs), the Renewable Portfolio Standard, and the Million Solar Roofs program.[5] The smart grid enables these and other greenhouse gas reducing strategies, to help meet the overall targets for the energy sector. As Rob Pratt of Pacific Northwest National Laboratory describes how a smart grid can "deliver" carbon savings: from end-use conservation & efficiency from demand response controls, peak load shifting, minimized losses & resistive loads from continually optimizing distribution voltage, cost effective & increasingly clean energy for electric vehicles, and improved end-use efficiency by delivering continuous, remote diagnostic & commissioning services. He also

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[4] CAL. IND. SYSTEMS OPERATOR, COMMENTS TO THE CAL. PUB. UTILITIES COMM. ON RULEMAKING 08-12-009 1-2 (Filed Dec. 18, 2008) *available at* http://docs.cpuc.ca.gov/EFILE/CM/114768.htm. [hereinafter CalISO]
[5] CAL. AIR RESOURCES BOARD, CLIMATE CHANGE SCOPING PLAN (Dec. 2008) *available at* http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf. [hereinafter SCOPING PLAN]

describes how a smart grid "enables" carbon savings: by using demand response to regulate fluctuations in wind power and enable high penetration of PV solar.[6]

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1. Energy Efficiency and Demand Response:

A 2009 paper by Dr. Subramanian V. Vadari of Battelle Energy Technology and Mike Davis of Pacific Northwest National Labs discusses how enhanced demand response could supply valuable ancillary services such as ramping and spinning and non-spinning reserves. They describe their pilot, which effectively and rapidly engaged customer loads using incentives and automated controls. Using an automated premise dispatch agent acting in accordance with previously defined customer preferences and fast, autonomous controls on clothes dryers and water heaters, they were able to respond to ancillary service signals on very short time scales. Peak demand reductions of 16% and average demand reductions of 9-10% were realized over extended periods of time.[7] Their findings demonstrate how California can build on its existing commercial demand response programs, using smart grid to tap residential demand response.

The smart grid can also help California meet its efficiency goals. According to Rob Pratt, customers can use scheduling and control capabilities of demand response equipment, including water heater and thermostat setbacks (shifting A/C loads) to reduce overall energy use, in addition to peak. He further notes that demand response networks can be leveraged to provide remote diagnostics that improve efficiency and reduce peak.[8] Achieving the CEC and CPUC goal of net zero energy use for all new residential buildings by 2020 and all commercial

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[6] Rob Pratt, Pacific Northwest National Laboratory, presentation to EEI Smart Grid E Forum: The Smart Grid's Role in a Carbon-Constrained World (Feb. 24, 2009). [Hereinafter PRATT]

[7] BATTELLE ENERGY TECHNOLOGY, INVESTIGATING SMART GRID SOLUTIONS TO INTEGRATE RENEWABLE SOURCES OF ENERGY INTO THE ELECTRIC TRANSMISSION GRID 5-6 (2009) *available at* http://www.battelle.org/electricity/vadari_davis.pdf.

[8] Pratt, *supra* note 6.

buildings by 2030[9] will require both greater efficiency and onsite generation.[10] The role of the smart grid in renewable energy is discussed in greater detail below.

2. Renewable Energy and Distributed Generation:

California is increasing the penetration of renewable generation through the loading order, the 33% RPS, and the Million Solar Roofs program. Vadari and Davis detail several operational and planning challenges presented by renewable resources: they are intermittent, depend on weather influences that cannot be "dispatched," are difficult to forecast, and often built by third parties. Renewable power plants are sometimes paired with fossil fuel generation to ensure reliability – undoing many of their climate benefits. Our work with the Pecan Street Project has convinced us that the smart grid can facilitate a higher penetration of renewables without backup generation by closely balancing their intermittency with demand response.

Vadari and Davis see additional opportunities for quick response to real-time system changes through smart grid hardware: Synchro-phaser Monitoring Units, Static Var Compensators and Flexible AC Transmission Systems. The authors note that smart grid software focusing on Wide-Area Monitoring and Power System Visualization will enhance system status knowledge. While their paper focuses on wind, they note that the same challenges and solutions apply to other renewable resources.[11] We attach their paper as Attachment B, noting that their comment on the needs of non-wind renewable energy sources do not apply to California, which has strong RPS requirements.

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[9] SCOPING PLAN, *supra* note 5, at 42.
[10] CALIFORNIA ENERGY COMMISSION, 2009 INTEGRATED ENERGY POLICY REPORT 59 (2009) *available at* http://www.energy.ca.gov/2009publications/CEC-100-2009-003/CEC-100-2009-003-CMF.PDF.
[11] BATTELLE ENERGY TECHNOLOGY, *supra* note7 at 3-5.

Another study underlines the potential disruptions that will be caused by high penetration PV in the absence of a smart grid. A demonstration PV cluster in Gunma, Japan commissioned by NEDO in 2002 included more than 550 houses with rooftop PV, an overall capacity of 2.2 MW distributed in a 1 sq km area. Groups of 5 to 15 PV-integrated houses with an average 4.1 kW of PV per house were connected to a low-voltage feeder and supplied to a low voltage transformer. The LV feeders were all connected to a medium voltage feeder which runs to a substation 7 km away. An increase in feeder voltage exceeding the standard voltage range was observed from August through Oct 2004. An increase in global solar radiation above 5 kWh/sq meter caused up to 2% increase in output voltage of individual inverters, and low loads during high solar periods also shifted the voltage of feeders by 2% above the maximum allowable limit. The study also documented negative power quality impacts of PV clusters on distribution networks: including voltage variation; phase imbalance, harmonic distortion in both voltage and current, flicker, and heating of distribution transformers.[12] The National Renewable Energy Laboratory (NREL) has also recently demonstrated that meeting a high RPS will require "load participation" – meaning demand side balancing.[13] As Vadari and Davis illustrate, smart grid technologies can help prevent disruptions caused by intermittent resources.

C. By reducing our dependence on fossil fuel generation, a well-designed Smart Grid will reduce air pollutant and toxics emissions

In addition to greenhouse gas reduction, a smart grid has the potential to reduce criteria pollutants and toxics. Reduction of peak demand and increased penetration of renewables -

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[12] FARID KATIRAEI, KONRAD MAUCH, & LISA DIGNARD-BAILEY, INTEGRATION OF PHOTOVOLTAIC POWER SYSTEMS IN HIGH PENETRATION CLUSTERS FOR DISTRIBUTION NETWORKS AND MINI-GRIDS, INTERNATIONAL JOURNAL OF DISTRIBUTED ENERGY RESOURCES (Sept 2007).

[13] R. Piwko et. al, National Renewable Energy Laboratory, Western Wind and Solar Integration Study: Draft Executive Summary (Feb., 2010) *available at http://wind.nrel.gov/public/WWIS/DraftExecSumm.pdf*.

facilitated by a smart grid as discussed above - will help to take heavily polluting fossil-fuel powered distributed sources offline. Electric power generation can release criteria and toxic pollutants or their precursors, so policies that reduce the need for generation will also help bring areas that are designated nonattainment under the Clean Air Act back into compliance.[14]

Analysis conducted by Synapse Energy Economics in support of New England's development of a competitive demand response program underscores the critical environmental and health benefits that could accrue to California. The New England study illustrates the potential for reduced operation of high-emitting oil and gas-fired units, and for more efficient resource operation overall. When demand response is used to meet reserve requirements, reductions of NOx (41 tons), SO2 (218 tons) and CO2 (31,800 tons) were possible in summer months.[15] Although the Synapse study reflects the unique generation profile in New England and the practices used by ISO New England to meet reserve requirements, it is a constructive framework for a similar analysis of the myriad benefits of demand response in California.

III. POLICIES AND EVALUATION CRITERIA TO INTEGRATE CALIFORNIA'S ENERGY POLICIES INTO THE DESIGN AND OPERATION OF THE SMART GRID

A. Joint Ruling Section 3.1: Use of Smart Grid Deployment Plans

The Joint Ruling requests input on the how the Smart Grid Deployment Plans should be used. We continue to support the suggestions on pages 5 and 6 - the deployment plans should be used

[14] U.S. Environmental Protection Agency, Cleaning Up Commonly Found Air Pollutants (2008) http://www.epa.gov/air/peg/cleanup.html.
[15] GEOFF KEITH ET. AL., prepared for US EPA, MODELING DEMAND RESPONSE AND AIR EMISSIONS IN NEW ENGLAND (Aug., 2003).

to establish a baseline, the CPUC should require periodic status updates, and the plans could be used as evidence of whether or not a specific investment is reasonable. This approach was supported by Southern California Edison (SCE).[16] San Diego Gas and Electric (SDG&E) suggested a more nuanced approach for their "visions."[17] PG&E suggested that the smart grid deployment plans not be mandatory or binding, and that the commission should consider proposals on an individual basis.[18]

We recognize that technology will never be at a standstill, but we need to ensure that utilities are responsible for the performance of their investments in meeting SB 17's requirements, including enabling California's environmental and energy policies. The smart grid deployment plans should have clear environmental and energy goals that are informed by state energy policy, and the utilities should be monitored for their performance in meeting them, regardless of the specific technologies they use or the process of investments approval. Even if proposals are approved on an individual basis, as suggested by PG&E, they should have to demonstrate how they fit into the goals set out in the utilities' smart grid deployment plans, as is suggested by the Commission on page 7.

Our work on the Pecan Street Project demonstrates that the deployment plans can have environmental and other goals that are enforceable, even if certain technology specifics change - we are planning environmental performance into the project, and will be regularly monitoring its success. For this project, while we have specified some technologies: a maximally open platform; lots of locally-appropriate solar PV; deployment of lowest-cost strategies first – we are

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[16] SOUTHERN CAL. EDISON, COMMENTS TO THE CAL. PUB. UTILITIES COMM. ON RULEMAKING 08-12-009 7-8 (Filed Dec. 18, 2008) *available at* http://docs.cpuc.ca.gov/EFILE/CM/114652.htm. [hereinafter SCE].
[17] SAN DIEGO GAS & ELECTRIC, COMMENTS TO THE CAL. PUB. UTILITIES COMM. ON RULEMAKING 08-12-009 3 (Filed Dec. 18, 2008) *available at* http://docs.cpuc.ca.gov/EFILE/CM/114739.htm. [hereinafter SDG&E].
[18] PACIFIC GAS & ELECTRIC, COMMENTS TO THE CAL. PUB. UTILITIES COMM. ON RULEMAKING 08-12-009 6-7 (Filed Dec. 18, 2008) *available at* http://docs.cpuc.ca.gov/EFILE/CM/114651.htm. [Hereinafter PG&E]

not explicitly defining the technological path. Rather, we are setting the goals and letting vendors demonstrate their capacity to meet or exceed those goals.

Additionally, SDG&E supported yearly updates, as an opportunity to "refresh and update," rather than provide redundant progress reports,[19] while Pacific Gas and Electric (PG&E) recommended against yearly updates.[20] Yearly status reports that include all of the smart grid investments, regardless of their appearance in other proceedings, help the legislature and the public monitor the progress of the smart grid. CEERT also notes that yearly updates are likely necessary to meet the requirements of SB 17.[21] While we support the ability of utilities to "refresh" their plans, they should not be able to fall back on their commitments to support California's energy policies – these commitments should remain the constant for monitoring purposes. To avoid redundancy, the updates could provide summaries and references to appropriate proceedings.

Finally, in order to further ensure that ratepayers are getting the full value of their investments, we reinforce our opening comments, asking that smart grid plans be formally linked to the larger utility planning and procurement processes, be prioritized, and be used to evaluate whether other investments, particularly in large power plants and power lines, are reasonable. The SB 17 smart grid deployment plans should be used in the utilities' planning process to help determine whether grid and generation investments are reasonable, in light of the capabilities that a smart grid enabled system can provide. We understand some parties' concerns that smart grid components may pose a significant cost - this approach would minimize the costs of the electricity system overall by offsetting other costs, ensure that we get the most out of smart grid

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[19] SDG&E, *supra* note 17 at 3.
[20] PG&E, *supra* note 18 at 7.
[21] CENTER FOR ENERGY EFFICIENCY AND RENEWABLE TECHNOLOGY, COMMENTS TO THE CAL. PUB. UTILITIES COMM. ON RULEMAKING 08-12-009 (Filed Dec. 18, 2008) *available at* http://docs.cpuc.ca.gov/EFILE/CM/114755.htm. [hereinafter CEERT]

investments by emphasizing investments with direct system benefits, and maximize environmental benefits.

B. Joint Ruling Section 3.2: Standards for Review of Smart Grid Plans

1. Requirements for Content and Submittal of Deployment Plans

In our Opening Comments on Section 3.2 of the Joint Ruling, we suggested that the CPUC incorporate additional environmental policies and performance standards into both the proposed requirements and evaluation criteria in accordance with §8366. We pointed out that such integration requires that criteria supporting the energy efficiency, demand response, renewable generation, and other environmental mandates be incorporated into the proposed "musts" for a smart grid. CEERT's comments support these criteria, asking the Commission to require the utilities' proposed Smart Grid deployment plans to demonstrate how they meet the policy objectives pursuant §8366, where the legislature enumerates the environmental policies of the state. CEERT further "stresses that utility deployment plans should explicitly describe how they will contribute to meeting the Energy Action Plan's key priorities for meeting the loading order: 1) energy efficiency, 2) demand response, 3) RPS, as well as the state's AB 32 goals."[22] For more information on our legal and policy analysis of the environmental requirements of SB 17, please see our opening comments.

Specifically, our opening comments suggested that the following requirements be added to the "musts" proposed on page 12 and 13. As a clarification, we are suggesting that the Commission ensure that the smart grid technologies *enable* these policy options, not that they decide on the policy details in this proceeding. In response to staff questions – in our view, meeting these requirements provides the foundation for workable incentives for customers.

[22] CEERT, *supra* note 21 at 6.

Enabling third parties access to a system that can evolve over time – and where third parties can play an active role in that evolution - will help by allowing iterative piloting, pricing options (like cell phone plans), and payments to consumers not just for electricity but also for ancillary services.[23]

1. **Enable maximum access by third parties to the grid, creating a platform for innovation in technology and services.**
2. **Have the infrastructure and policies necessary to enable and support the sale of demand response, energy efficiency, distributed generation, and storage into wholesale energy markets as a resource, on equal footing with traditional generation resources.** In our initial comments, we noted the importance of communicating necessary information to CalISO. CalISO elaborated in its comments that achievement of high standards for grid reliability requires fast and accurate data and information exchanges, including "wide situational awareness" and "deep situational awareness." It offers recommendations for demand side resources and renewable generation, including Auto-DR and innovative storage devices. It further emphasizes the importance of smart substations to monitor the loads and resources in the local area and provide visibility to assure CalISO that there is adequate transmission capacity and generation reserves. We strongly recommend that CalISO's needs be further analyzed and incorporated into the smart grid deployment plans to support state goals for renewable energy and demand response.

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[23] For more information on consumer behavior, please see: Hunt Allcott and Sendhill Mullainathan, *Behavior and Energy Policy* 327 SCIENCE 1204-1205 (2010) ; AHMAD FARUQUI AND SANEM SERGICI, THE BRATTLE GROUP, THE POWER OF EXPERIMENTATION: NEW EVIDENCE ON RESIDENTIAL DEMAND RESPONSE (2008);
Charlie Wilson and Heidi Dowlatabadi, *Models of Decisions Making and Residential Energy Use* 32 ANNUAL REVIEW OF ENVIRONMENTAL RESOURCES 169-203 (2007)

3. **Significantly reduce the total environmental footprint of the current electric generation and delivery system in California.** We fully support the arguments that Tendril makes to change Commission's suggested criteria "Run more efficiently" to "Reduce greenhouse gas emissions and improve utilization of system,"[24] based on the legislative intent of SB 17 and federal policy. However, their suggestion should be made broader to reflect other state policies, such as air quality laws. Therefore, we believe that our suggestion – "significantly reduce the total environmental footprint of the current electric generation and delivery system in California" – should either be an additional criterion or be used instead of Tendril's suggested criterion. We fully support Tendril's suggestion that "Enable penetration of intermittent power generation sources" be amended to "Enable penetration of clean, renewable and intermittent power generation sources."[25]

In response to comments by the utilities, we reiterate our support for the Joint Ruling's proposal for deployment plan submittal, including requiring utilities to discuss how their planned Smart Grid will perform in each of the areas outlined on pages 12 and 13 (with above additions); "a timeline; and necessary financial investments. We also reinforce that the utilities should also openly take into account investments smart grid displace or avoid, including (for instance) new generation and transmission and distribution wires, in order to give a full picture of the system.

SCE noted that "timelines included in the deployment plans will likely require updates and modifications as a result of dynamic and changing policy requirements, technology

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[24] TENDRIL, COMMENTS TO THE CAL. PUB. UTILITIES COMM. ON RULEMAKING 08-12-009 (Filed Dec. 18, 2008) *available at* http://docs.cpuc.ca.gov/efile/CM/114794.pdf at 3 [hereinafter TENDRIL].
[25] TENDRIL, *supra* note 23 at 4.

developments, and…needs."[26] SDG&E agreed with the need to include a timeline, but suggested the Commission use different timelines for two different decision criteria paths that accommodate state energy policy goals and adopt near term priorities.[27] PG&E found it premature to produce a timeline.[28] Cisco also noted that utilities should have flexibility in timing and staging proposed deployments of Smart Grid technologies in a manner that makes the most business sense."[29]

We agree that it is reasonable for utilities to have a master timeline and short term timelines. If the Commission follows this approach, the master timeline should identify California's energy policy priorities and a general timeline for meeting them (i.e. a 33% RPS by 2020), with milestones to indicate how deadlines will be met. For example, meeting the 33% RPS by 2020 will require that smart grid investments begin well in advance of the set deadlines to support the installation of renewable generation. Specific timelines should detail specific steps to meet near term needs, and should be created in anticipation of policy milestones and deadlines. Additionally, utilities should be able to update timelines, but there should be a presumption that the master timeline should remain the same unless there have been changes in state policy. This approach balances flexibility based on what makes "business sense," which Cisco suggested, with what is required to enable California's energy policies. For example, important milestones will need to be met to enable utilities to meet the RPS, but there will be flexibility for goals that are not mandated by state policy.

2. Determining the Appropriate Standard of Review

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[26] SCE, *supra* note 16 at 6.
[27] SDG&E, *supra* note 17 at 5-6.
[28] PG&E, *supra* note 18 at 8.
[29] CISCO SYSTEMS, COMMENTS TO THE CAL. PUB. UTILITIES COMM. ON RULEMAKING 08-12-009 8 (Filed Dec. 18, 2008) *available at* http://docs.cpuc.ca.gov/EFILE/CM/114751.htm. [hereinafter Cisco]

The standard of review for the deployment plans must ensure that they will enable the state's requirements for greenhouse gas reductions under AB 32, the 33% RPS, energy efficiency, demand response, and air quality. As Cisco develops its approach it says "the regulator needs to specify what is important to it in the development of the Smart Grid by stating broad policy outcomes the state wants to achieve, and the utility needs…flexibility to produce those outcomes."[30] We acknowledge that changes in technology will require some flexibility about choices, and suggest that they PUC follow a similar approach to the Pecan Street Project: the CPUC should set clear requirements to enable state energy and environmental policy in the utilities' deployment plans, require and evaluate detailed plans to meet near-term policy needs, and evaluate the actual deployments for their success. The ways that utilities meet those goals can be more flexible, and yearly updates can help ensure that the goals are being met and direct any necessary changes to get on course to meeting the requirements.

PG&E suggested that there needs to be a "good deal of flexibility and leeway in what the plans must contain and demonstrate."[31] PG&E further suggested that "all participants in the Smart grid will be better off if the Commission avoids imposing 'top down' requirements and criteria on the requirements for initial Smart Grid deployment plans." Cisco also noted that "requirements for deployment plans should be sufficiently flexible to allow for differences… and be modified over time."[32] Ensuring that ratepayers get the most out of investments requires that policy goals be set by the CPUC and deployment plans and updates be evaluated for their ability to meet them, while allowing for experimentation, differentiation, and innovation.

A strict reading of Cisco's comments on the approach to meeting the requirements of SB 17 seems to be in contrast with ours, but our suggestions can be harmonized. Cisco states "In

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[30] Cisco, *supra* note 28 at 7.
[31] PG&E, *supra* note 18 at 10.
[32] Cisco, *supra* note 28 at 6.

Cisco's view, the statute does not require that each utility address every legislative objective in SB 17 as part of its deployment plan…SB 17 requires that actual deployments be evaluated for consistency with state initiatives listed in [§8366]…Utilities should have flexibility in timing…"[33] Cisco went on to say that compliance with Section 8366 must occur in rate cases.[34] If this statement is read as meaning that the utilities do not have to outline their approach to meet §8366, the plans will not be helpful tools to decide which technologies to bring to rate cases, where Cisco acknowledges that they must be evaluated for compliance with §8366. Indeed, Cisco previously states that "the regulator needs to specify what is important to it in the development of the Smart Grid by stating broad policy outcomes the state wants to achieve, and the utility needs…flexibility to produce those outcomes."[35] We suggest that the CPUC require utilities to outline their approach to meeting all of the §8360 and 8366 requirements, but allow the level of detail to be determined by the proximity of the policy need.

C. Joint Ruling Section 3.3: Review of Subsequent Investment Plans

We agree with the Commission and the majority of the parties "that the most efficient regulatory approach would consider all Smart Grid deployment plans in a single proceeding." We see no reason why this practice should end after the first year – while specific investment timelines may differ, considering updates in one proceeding allows utilities to learn from each other and the public to better monitor the process. Additionally, as CEERT indicates, having plans considered in the same proceeding ensure that they are based on the same standards and principles across utilities – this consistency will be just as important in the next several years.

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[33] Cisco, supra note 28 at 8.
[34] *Id.* at 8.
[35] *Id.* at 7.

D. Joint Ruling Section 3.4: Comments Sought on Uses of Smart Grid Deployment Plans and on Procedures and Standards for Evaluating the Smart Grid

In addition to demonstrating that the plans meet the substantive requirements of the smart grid, as discussed in Section 3.2 of the Joint Ruling, briefly above and in our Opening Comments, we continue to support additional procedural requirements. Based on what we have learned from our Pecan Street Project in Texas, we recommend that utilities be required to have a public process, bringing in consumers and other stakeholders, and an alternatives analysis. Engagement of the community from the outset helps to avoid later controversy. We note here that the Greenlining Institute also supported the need for an alternatives analysis.[36]

We also believe engaging communities and consumers in the design and deployment of the smart grid will start to address Greenlining's overall concerns. We support Greenlining's assertion that the smart grid should be inclusive of diverse communities as it develops. Greenlining says, "The Smart Grid offers the potential of benefits for individual customers – if they are able to interact with it, either through an advanced metering device or some other consumer device that communicates with the Smart Grid… the potential benefits are great – and these benefits must be deployed in an equitable manner."[37] They are concerned that some communities will not have access to the smart grid technology itself, or the technology necessary to communicate with it. From our perspective, in addition to benefitting these communities, their ability to interact with the smart grid adds to the overall success of the system. While we have not evaluated Greenlining's specific suggestions, we ask that the Commission identify and lower barriers to smart grid technologies for all Californians as the grid develops.

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[36] GREENLINING INST., COMMENTS TO THE CAL. PUB. UTILITIES COMM. ON RULEMAKING 08-12-009 13 (Filed Dec. 18, 2008) *available at* http://docs.cpuc.ca.gov/EFILE/CM/114770.htm. [hereinafter Greenlining]

[37] Greenling, *supra* note 36 at 11.

E. Joint Ruling Section 3.5: Standards and Protocols Adopted Pursuant to §8362

Ultimately, the Commission should adopt consistent, uniform standards for all regulated utilities. Consistent standards create opportunities for third parties to achieve economies of scale across utility territories. One of the major benefits of the smart grid is the ability to share information – usage data, prices, etc. – between entities that have been authorized by the customer. Not only is this of benefit to the third party service provider, it is of benefit to customers, such as chain store retailers, who may have facilities across the state in all three utility service territories, but who seek to deploy energy solutions in a uniform way across all their facilities. The cleanest and most effective way to share information is through interoperability standards common across California.

Therefore, we support the recommendation by CEERT and others that the Commission stay aligned with the standards, guidelines and protocols adopted by NIST,[38] which will be informing the design of the Pecan Street Project. The timing of the release of the NIST standards should work well with the timelines set in SB 17 for the deployment plans. Cisco similarly suggested that the CPUC defer its consideration of standards and protocols to another proceeding that will commence after a number of the agencies listed in §8362 have adopted standards or protocols.[39] If the Commission defers to NIST, it may wish to adopt an interim rule based on the work that NIST has done and require that any interim investments later upgrade to comply with NIST to the extent possible. We support CEERT's suggestions that the Commission confer with NIST before adopting any protocols.[40]

Relatedly, staff asked for perspective on the national direction of the smart grid, which is being shaped by several key groups. The National Energy Technology Lab (NETL) has mapped

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[38] CEERT, *supra* note 21 at 9-11.
[39] Cisco, *supra* note 29 at 9.
[40] CEERT, *supra* note 21 at 10.

the seven key smart grid functionalities, which the Commission appears to have used to create the "musts" on page 12 and 13.[41] EPRI is providing utilities a method to translate these functions into measurable, monetized benefits in four categories: economic, reliability, environmental and security. DOE's requirements for ARRA grants—shaping many of the smart grid deployments now under way-- are similar but not identical to NETL's: 1) job creation and marketplace innovation; 2) peak demand and electricity consumption; 3) operational efficiency; 4) grid reliability and resilience; 5) distributed energy resources and renewable energy; and 6) carbon dioxide emissions. The Commission may want to monitor the efforts of these groups, in addition to those listed in section 8362(a).

F. Joint Ruling Section 4: Tasks Assigned to this Phase of the Proceeding by D.09-12-046 (Customer and Third Party Access to Usage and Cost Information)

1. Customer and Authorized Third Party Access: Types and Timeliness of Data

As we stated in our earlier comments, D.09-12-046 provides an important key to making the smart grid work, by ensuring that the customers, directly or through their authorized third parties, are empowered to make choices about their energy use.[42] We support providing retail and wholesale price, usage and generation source data to customers and authorized third parties on as near to real time basis as possible to facilitate timely reaction to price signals and to enable distributed generation and demand response to fully participate in ISO's wholesale energy market. In response to staff questions, our understanding is that the ISO already has access to 15

[41] Specifically, the smart grid characteristics NETL discusses are: 1) accommodates all generation and storage options; 2) optimizes assets and operates efficiently; 3) provides power quality for 21st century needs; 4) resists attack; 5) self-heals; 6) motivates and includes the customer; 7) enables markets.

[42] California Public Utilities Commission, D.09-12-046 qtd. in Joint Ruling (Feb. 8, 2010) p. 20. Specifically, D.09-12-046 adopted as a policy objective the provision of retail and wholesale price information "by the end of 2010," access to usage data through an agreement with a third party "by the end of 2010," and access to usage data on a near real-time basis for customers with an Advanced Metering Infrastructure (AMI) meter "by the end of 2011."

minute interval data for utility scale generation sources, possibly even 5 minute or smaller intervals and that AMI metering infrastructure being installed by all three utilities in the state are capable of collecting and reporting data at a minimum of 15 minute intervals in real time. This is a critical design criteria that must be met if California's smart grid investments are going to support market-based demand response and distributed renewable deployment.

In our opening comments, we noted that Appendix B should be amended to provide the range of data that would optimize authorized third party services in as close to real time as possible and that the CPUC should set a short-term deadline for the utilities to share backhaul data with customer-approved third parties. In terms of real time data, we support Google analysis that "central to the richness of a customer's experience is the granularity of the data available to the customer both in frequency of data collection and timing of availability of the data. Simply put, the greater the frequency of the data collected and the fresher that data is, the more valuable it is to the customer."[43] To this end, we support CEERT's request for data at the 1-minute interval level.[44] We also reemphasize our support for customer and authorized third party access to meter data in light of CEERT's recommendation that "the Commission to provide access to customer data to customers and their agents at the meter" to avoid delays[45] and AReM's request that "customers and their authorized agents (ESPs, DRPs, etc.) … have simultaneous, direct access to meter data … be the default for all customers with advanced meters, including residential and small commercial customers."[46]

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[43] GOOGLE INC., COMMENTS TO THE CAL. PUB. UTILITIES COMM. ON RULEMAKING 08-12-009 4 (Filed Dec. 18, 2008) *available at* http://docs.cpuc.ca.gov/published/proceedings/R0812009.htm.
[44] CEERT, *supra* note 21 at 13.
[45] *Id.* at 16.
[46] ALLIANCE FOR RETAIL ENERGY MARKETS, COMMENTS TO THE CAL. PUB. UTILITIES COMM. ON RULEMAKING 08-12-009 4 (Filed Dec. 18, 2008) at 4, *available at* http://docs.cpuc.ca.gov/efile/CM/114793.pdf.

We also stated that customers and authorized third parties should be given access to necessary demand, voltage, current, kVar, power factor, frequency and other information (e.g. generation source data). To further elaborate on our request, this information is needed to bid in ancillary services, like voltage support. KVar is very important to larger consumers as it includes both "real" power (kW) and the power needed to create magnetic fields around motors, etc. Large users find it a useful parameter, and are sometimes billed for kVar instead of kW, and low power factor (kW/kVar) can cause electrical problems at a facility. After usage, demand, and voltage, power factor is most often the next most important electrical management parameter to users and utilities. Overall, a system that is capable of providing this information, as authorized by the customer, will allow third party providers to provider better services.

2. Privacy and Cyber-Security

We believe that smart grid data transfer, customer concerns (including ease of use, financial savings, and privacy), and security can comfortably coexist. CEERT, Tendril, Cisco and other parties have begun to demonstrate how regulations protecting customer privacy can be completely complimentary with data transfer to third parties. Tendril states that "by recognizing these privacy concerns early, the smart grid industry will be in an even better position to address privacy concerns and thereby earn consumer trust," and offers promising suggestions.[47] As Cisco notes, "there are industry best practices and approaches to public-private partnership that have proved effective and valuable in addressing security threats to other communications systems."[48] Cisco further details its own "vision for Smart Grid security is based on principles

[47] Tendril, *supra* note 23 at Attachment A, page 6.
[48] Cisco, *supra* note 28 at 15.

learned from years as the world leader in building secure data networks."[49] CEERT suggests deferring to the NIST on cyber-security issues, but recommends adopting rules to protect data while in the care of third parties.

We do not object to the Commission's indication that it will answer these questions in the next phase of this proceeding, but we urge the Commission to move on the timeline indicated in D.09-12-04 to ensure that consumers and the environment reap the full benefit of the smart grid. Concerns about data security and privacy can and should be addressed without slowing innovation or achievement of the environmental promise of smart grid technology deployment.

G. Joint Ruling Section 5.1: Should the Commissions Measure Smart Grid Deployment Using Quantitative Metrics? What Metrics Should the Utilities Be Required to Use?

As we stated in detail in our Opening Comments, we support the metrics given in Appendix C, along with additional metrics on the greenhouse gases, RPS, energy efficiency, demand response, air quality, consumer access to data, and innovation. The richness of data that would come from the existing and proposed metrics is essential to analyzing the success of the investments. For pollutants where timing is important, such as NOx, utilities should measure emissions in shorter time increments to encourage innovations. CEERT also indicated that the metrics should include environmental benefits.[50]

In response to staff questions, measuring the smart grid's impact on AB 32 should take into account a number of things – it makes the overall electricity system more efficient through reduced line losses, dynamic rating, etc., and enables a number of CARB's key policies, like the

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[49] *Id.* at 17.

[50] CEERT, *supra* note 21 at 18-19. Specifically, they suggested "criteria, toxic and greenhouse gas emissions reduced or avoided as a result of the rollout of the Smart Grid including the integration of grid connected vehicles; and how a utility's smart grid deployment plan explicitly facilitates achieving RPS goals, for both distributed *and non-distributed* resources."

RPS.[51] We believe that the best way to account for these benefits is to measure the overall carbon intensity of the system and the total greenhouse gas production. PJM is already developing means to measure "how much CO2 was produced year to year, month to month, peak or off-peak."[52] Other metrics that we suggested measure the smart grid's enabling of policies specifically mentioned in the Scoping Plan, namely the RPS and energy efficiency. To fully capture the effect of the smart grid on Scoping Plan policies, an additional metric should report on smart grid's facilitation of the Million Solar Roof program.

Given that those ratepayers are paying for the installation of the most of the utilities "smart grid," the utilities must be accountable to them. In contrast, PG&E stated that "it is difficult and potentially misleading for the Commission, utilities and third-parties to settle on objective, quantitative metrics that would apply for purposes of regulating or monitoring…"[53] The limited metrics suggested by the utilities simply do not – and can not – reflect the nuances required to determine if the investments are working towards California's policies. For example, reporting only the MW of demand response or energy efficiency does nothing to tell of the types of programs that are succeeding. It could not tell us whether the smart grid is enabling third party programs or residential demand response. Nor does reporting the number of electric vehicles tell us how they are interacting with the system or help us predict future system needs. We need to have the level of detail of the proposed and suggested metrics to monitor the progress of the system on the mandated environmental policies listed in SB 17.

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[51] Additional information on CARB's energy policies can be found in our opening comments or the Scoping Plan.
[52] PJM INTERCONNECTION, PJM REPORTS NEW CARBON DIOXIDE EMISSIONS DATA, Press Release (March 25, 2010) http://www.pjm.com/~/media/about-pjm/newsroom/2010-releases/20100325-pjm-reports-new-carbon-dioxide-emissions-data.ashx.
[53] PG&E, *supra* note 18 at 12.

H. Joint Ruling Section 5.2: Incentives for Deployment and Consideration of Demarcation Point Between Utility and Consumer

In our opening comments, we noted that the greatest public interest is served when the market for providing behind the meter products and services to customers are open to a wide variety of providers, including the utility and competitive service providers. We continue to support this position, as it is supported by a wide variety of parties. For example, CEERT states that "the utility may be among those that offer after-the-meter services, but they should not have an exclusive right to do so,"[54] and PG&E states that "it is extremely important…that the Commission encourage a wide variety of market participants and potential programs, and let utilities, vendors and customers then choose..."[55] Therefore, we think that it is essential that third parties are able and encouraged to provide behind the meter services – ensuring that they have this ability could be considered a "demarcation point."

I. Joint Ruling Section 5.3: Electric Vehicle Related Issues

As we noted in our opening comments, EDF is a party to the Commission's proceeding R.09-08-009 on Electric Vehicles and filed a brief in response to the scoping memo dated January 12, 2010. We recommended that the Commission avoid isolating the question of standards related to electric vehicles to this proceeding on smart grids (R 08-12-009) as proposed. Several parties provided similar comments. SCE suggested that the "the Commission confine its consideration in this proceeding to those electric vehicle standards that are related to the integration of PEVs to the Smart Grid"[56] PG&E recommends "that discussions relating to consumer device-specific incentives be undertaken in the respective public or ratemaking proceedings in which programs

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[54] CEERT, *supra* note 21 at 23-24.
[55] PG&E, *supra* note 18 at 17.
[56] SCE, *supra* note 16 at 28.

or activities related to the devices are being considered, e.g. electric vehicle incentives in the Electric Vehicle OIR…"[57] Therefore, while this proceeding may cover technological standards, we suggest that R.09-08-009 continue to have domain over regulation of EV charging systems, streamlining of charging installation, near-term utility activities, rate design policy, direct charging management, and EV metering. Further, we support CEERT's comment that "the Commission must ensure that the efforts in these two proceedings work in concert to achieve the State's climate, energy and environmental goals."[58]

J. Joint Ruling Section 5.4: Should Smart Grid Proposals include storage options? Should Smart Grid Proposals limit storage options?

EDF supports the inclusion of storage options and enabling infrastructure in the smart grid plans - as the ISO stated these are "a category of smart grid technologies with profound promise to help achieve California's renewable resource and greenhouse gas emission targets."[59] We encourage storage be allowed to be provided in a competitive marketplace as long as threshold performance standards are set and achieved. In such instance, storage should be able to be provided both by utilities and by third parties, and range from distribution (customer scale) to transmission (utility scale) points of installation. Furthermore, we recommend that the smart grid deployment plans ensure that sufficient infrastructure is in place to enable the sale of storage into wholesale energy markets as a resource while also allowing storage providers to market and sell the ancillary services the storage devices provide.

We support the ISO's suggestion that "the Commission should encourage the deployment of storage devices and not impose limitations on how utilities pursue storage opportunities...

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[57] PG&E, *supra* note 18 at 16-17.
[58] CEERT, *supra* note 21 at 24.
[59] CalISO, *supra* note 4 at 4.

examine communications protocols for storage devices at the distribution level that are compatible with flexible market structures and resource functions [and] support an open network and not create limitations on the ISO's visibility of storage devices, including those devices' state of charge or ability to consume or generate electricity."[60] As we noted in our opening comments, the Commission should also avoid locking the smart grid into particular technologies and instead create a flexible, competitive market by setting performance standards for individual storage providers and devices to meet.

IV. CONCLUSION

Based on our experience with the Pecan Street Project, we recommend creating a plan based on the state's energy goals, then choosing the technologies, and then evaluating success. We further recommend engaging the consumer when developing and implementing the plans. These tactics will help the utilities avoid the possible pitfalls of smart grid deployment.

Environmental Defense Fund thanks the Commission for the opportunity to provide these comments on the Joint Ruling. We look forward to working with the Commission to incorporate the environmental requirements of SB 17 and our experience with PSP into the smart grid deployment plans.

Respectfully signed and submitted on April 7, 2010.

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[60] CalISO, *supra* note 4 at 7.

CERTIFICATE OF SERVICE

I hereby certify that, pursuant to the Commission's Rules of Practice and Procedure, I have this day have served a true copy of REPLY COMMENTS OF ENVIRONMENTAL DEFENSE FUND ON PROPOSED POLICIES AND FINDINGS PERTAINING TO THE SMART GRID, Attachment A, and Attachment B on all parties identified on the attached official service list for Proceeding: R08-12-009.

Service was completed by serving an electronic copy on their email address of record, and by mailing paper copies to parties without email addresses.

Executed on April 8, 2010 at Sacramento, California

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