

**BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA**

In the Matter of the Application of San Diego  
Gas & Electric Company (U902E) for Adoption  
of its Smart Grid Deployment Plan

Application 11-06-006  
(Filed June 6, 2011)

And Related Matters.

Application 11-06-029  
Application 11-07-001

**REPLY OF ENVIRONMENTAL DEFENSE FUND**  
**REGARDING THE CONSOLIDATED APPLICATIONS OF**  
**SAN DIEGO GAS & ELECTRIC COMPANY,**  
**SOUTHERN CALIFORNIA EDISON,**  
**AND PACIFIC GAS & ELECTRIC COMPANY,**  
**FOR ADOPTION OF SMART GRID DEPLOYMENT PLANS**

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**I. INTRODUCTION**

Environmental Defense Fund (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 R.08-12-009 and the Pecan Street Partnership (“PSP”),<sup>1</sup> and our involvement with the Citizen Utility Board (CUB) in Illinois.

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<sup>1</sup> PSP is 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. 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. On March 24<sup>th</sup>, 2010, the PSP participants released a report of recommendations for transforming electricity delivery into a customer-focused clean energy system.

EDF staff have been preparing to evaluate the IOU Smart Grid Deployment Plans since January 2011, and have been actually evaluating them since they were submitted in June and July of 2011. Furthermore, EDF has been actively participating in R.08-12-009<sup>2</sup> since February 2010, and provided much of the information that the Commission used to develop the environmental requirements in the Decision Adopting Requirements for Smart Grid Deployment Plans Pursuant to SB 17 (Padilla), Chapter 327, Statutes of 2009 (D.10-06-047).

Our deep involvement in this project is motivated by the enormous opportunity that well-designed smart grids present for improving environmental conditions and empowering consumers in California and the United States. Smart grids can reduce our reliance on fossil fuels by optimizing grid efficiency, bringing clean power online, and even enabling the transformation of our transportation system, while priming the grid for dynamic pricing, innovation, energy storage and new energy services.<sup>3</sup> All of these abilities add up: leading analyses indicate that well-designed smart grids can reduce the emissions from the electric sector by 30% and the emissions from the transportation sector by 25% nationally by 2030.<sup>4</sup>

Since D.10-06-047 was issued in late June of 2010, EDF has been working on two “tracks” in preparation for our involvement in the consolidated application proceeding A.11-06-006. Since January 2011, separate teams of EDF staff have 1) worked directly with SDG&E, and to lesser extent PG&E, to provide our opinions and insights to assist the development of their deployment plans and 2) created an Evaluation Framework For Smart Grid Deployment Plans (“Evaluation Framework” or “Framework”)<sup>5</sup> to evaluate the plans’ ability to achieve the full range of environmental and consumer benefits possible through the smart grid. These two “tracks” and our internal protocol to avoid biasing our evaluation are discussed in detail in our Response to the IOU deployment plans, dated August 4, 2011.

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<sup>2</sup> 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, <http://docs.cpuc.ca.gov/published/proceedings/R0812009.htm>

<sup>3</sup> Electric Power Research Institute (EPRI), Methodological Approach for Estimating the Benefits and Costs of Smart Grid Demonstration Projects, Jan. 2010, p. 1-1, *available at* [http://my.epri.com/portal/server.pt?Abstract\\_id=00000000001020342](http://my.epri.com/portal/server.pt?Abstract_id=00000000001020342)

<sup>4</sup> Studies include: Silver Spring Networks, “Connecting Smart Grid and Climate Change,” Michael Jung and Peter Yeung, Silver Spring Networks; PNNL: [http://energyenvironment.pnl.gov/news/pdf/PNNL-19112\\_Revision\\_1\\_Final.pdf](http://energyenvironment.pnl.gov/news/pdf/PNNL-19112_Revision_1_Final.pdf); Austin Energy 2010 Annual Report of System Information; US Energy Information Administration, Annual Energy Outlook, 2010; Khlaq Sidhu, Burghardt Tenderich: [http://cet.berkeley.edu/dl/CET\\_Technical%20Brief\\_EconomicModel2030\\_f.pdf](http://cet.berkeley.edu/dl/CET_Technical%20Brief_EconomicModel2030_f.pdf)

<sup>5</sup> The Evaluation Framework was included in our first August 4, 2011 Response and is available online at [http://www.edf.org/documents/11795\\_EDF\\_SG\\_Evaluation\\_Framework\\_June\\_2011.pdf](http://www.edf.org/documents/11795_EDF_SG_Evaluation_Framework_June_2011.pdf).

As described in our Response, EDF’s framework was developed principally by Tim O’Connor, EDF Attorney, and Karen Herter, Founder and President of Herter Energy Research Solutions, Inc. Upon submission of the deployment plans to the CPUC by the state IOUs, O’Connor and Herter applied the framework to the plans, in collaboration with Roger Duncan, former general manager of Austin Energy. This application of the EDF framework to the plans was exactly the reason the EDF made the framework, and has helped inform these comments.

These reply comments present the analysis and scoring of the three IOU’s smart grid deployment plan applications based on the Evaluation Framework. These reply comments are organized as follows:

Section I. Brief Introduction

Section II. Summary of the scores arrived at through EDF Framework

Section III. Brief overview of the plans’ completeness for achieving CPUC goals

Section IV. Brief overview of the plans’ completeness within discrete sections

Section V. In-depth discussion of each utility plan and score

It is important to note that these scores are “midterm grades.” While each utility’s plan has strengths and weaknesses, all can be significantly improved through the course of this proceeding and additional work on the plans. We look forward to working with the Commission and the three IOUs to ensure that these plans form a solid foundation for California’s clean energy future.

## II. SUMMARY SCORES

Utility	Score (out of 40)	Corresponding grade
PG&E	28.9	C (72%)
SCE	31.8	B - (80%)
SDG&E	32.3	B - (81%)

### **III. OVERVIEW: HIGH-LEVEL OBSERVATIONS ABOUT THE THREE PLANS – Goals for Deploying the Smart Grid**

EDF's framework focused on four of the eleven goals included in CPUC decision D.10-06-047. Upon thorough review, EDF chose to focus on these goals because they distill and incorporate much of the content of all the goals identified by the Commission: a score based on these four is therefore strongly predictive of the plans' overall likelihood of success. In all cases, the ranking is based on how well the plans chart a course to achievement of policy goals *already established* by the California legislature and regulators, reflecting the broader goals of California's citizens.

#### **a. Overview: Plan Goals and Scores for Empowering Consumers**

Empowering consumers through smart grid deployment is critical to delivering the widest-ranging benefits possible. Since the CPUC decision and SB 17 lay out a number of specific strategies for empowering consumers, utility plans had to provide a comprehensive portfolio of these measures to achieve a high score within the EDF framework. Specifically, with respect to consumer empowerment, D.10-06-047 states that a smart grid should enable consumers to change their behavior in response to dynamic prices. Further, California SB 17 encourages the incorporation of cost-effective smart technologies, including real time, automated, interactive technologies that optimize the physical operation of appliances and consumer devices for metering, grid communications, and distribution automation.

To capture the CPUC decision and SB 17 requirements on consumer empowerment, EDF's framework includes 13 criteria by which to evaluate utility approaches (listed here in summary form, and with more explanation in the Framework): Dynamic Pricing Options, Demand Management, Plug-and-Play, Generation Choice, Consumer Technologies, Electric Vehicles, Information, Customer Service, Customer Bills, Customer Equity, Data Access and Privacy, Power Quality and Power Reliability. Each of these criteria was discussed in at least one of the utility deployment plans, and most were discussed in all three - with the exception of customer equity and generation choice, the least-effectively covered criteria.

In general, the utilities' vision and strategy sections performed well in this area, touching on nearly all criteria for consumer empowerment. Additionally, since several consensus metrics were included in this area, utilities generally performed well in the metrics category. However, across the board the utilities failed to provide meaningful, quantifiable goals by which to measure their progress – sending all scores significantly lower. Unless the utilities set such concrete goals, it will be difficult for the PUC and ratepayers to track their progress and hold them accountable.

**b. Overview: Plan Goals and Scores for Creating a Platform for Technologies and Services**

Creating opportunity for new energy technologies and services to gain access to the grid and electricity markets is essential to maximizing innovation and minimizing costs. Again, utility plans were assessed on a comprehensive portfolio of measures which were derived from the CPUC decision and SB 17. With respect to a platform for technologies and services, D.10-06-047 states that smart grid plans should enable maximum access to the grid by third parties, creating a welcoming platform for deployment of a wide range of energy technologies and management services.

To capture the CPUC decision and SB 17 requirements in this area, EDF's framework identifies the following three criteria for a strong strategy to create a platform for new technologies and services (listed here in summary form, and with more explanation in the Framework): Interoperability, Standard Protocols, and Upgradable Software. All three utilities covered all three criteria in their plans, though the treatment of upgradeable software was not of uniform quality.

In general, the utilities' vision and strategy were strong in this area, touching on every core criteria. Additionally, since several consensus metrics were included, utilities generally performed well in the metrics category. However, across the board utilities failed to provide for meaningful, quantifiable goals by which to measure their progress, sending all scores significantly lower.

**c. Overview: Plan Goals and Scores for Allowing Sales of Demand Side Resources in Wholesale Markets**

Allowing demand side resources to sell into competitive markets is a valuable mechanism for growing large-scale innovative energy solutions. With respect to participation of demand-side resources in energy markets, D.10-06-047 states that utility smart grid deployments should 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. California SB 17 requires the deployment and integration of cost-effective advanced electricity storage and peak shaving technologies, including plug-in electric and hybrid electric vehicles, and thermal-storage air-conditioning.

To capture the CPUC decision and SB 17 requirements in this area, EDF's framework identified the following 4 criteria for a strong strategy to allow for sales of demand side resources into wholesale markets (listed here in summary form, and with more explanation in the Framework): Data Access, Data Transmission, Real-time Market Integration, and New Commercial Markets. All utilities covered each criteria in their plans.

In general, the utilities' vision and strategy sections were adequate in this area, touching on every criteria. However, since only one consensus metric exists in this area, and the utilities did not pursue non-consensus metrics, they generally performed poorer in this category than others. Additionally, since all utilities failed to provide for meaningful, quantifiable goals by which to measure their progress in each criteria, (with the exception of SCE for distributed generation) scores were sent lower still.

**d. Overview: Plan Goals and Scores for Reducing the Environmental Footprint of the Grid**

Reducing the environmental impact of the electricity system is essential to meeting many of California's state environmental and public health policies. With respect to environmental goals, D.10-06-047 states that the smart grid should "significantly reduce the total environmental footprint of the current electric generation and delivery system in

California.” Similarly, SB 17 directs the CPUC to evaluate the impact of the smart grid on achievement of state goals for reducing emissions of greenhouse gases as set forth in the California Global Warming Solutions Act of 2006 and other state directives.

To capture the CPUC decision and SB 17 requirements in this area, EDF’s framework identified the following 8 criteria (listed here in summary form, and with more explanation in the Framework): Asset Utilization, System losses, Criteria pollutants, Greenhouse gas emissions, Renewables, Water use, Land use, and Solid waste. Each of these criteria was covered in at least one utility plan, with the exception of solid waste reduction.

In general, the utilities’ vision and strategy sections performed well in this area, touching on most of the critical criteria. However, since very few consensus metrics exist in this area and utilities did not pursue non-consensus metrics, every utility performed poorly in the metrics category. Additionally, since all utilities failed to provide for meaningful, quantifiable goals by which to measure their progress in each criterion, scores were sent lower still. Accordingly, although each utility says the smart grid will reduce the overall environmental footprint, and two utilities calculated potential savings, no utility proposed any method by which to establish goals or track progress in this category – earning all a very poor grade.

#### **IV. OVERVIEW OF THE THREE PLANS – Organization and Discussion within Plan Sections**

##### **a. Overview: Vision Sections**

In general, all three utilities developed coherent and thoughtful vision statements with characterizations for what the smart grid was, what it can do, and how it can / will benefit the customers within their service territories. Overall, all utilities’ visions received high scores by EDF as we applied the Framework, with the highest scores going to plans that 1) engaged and listened to customers and stakeholders in the development process, and 2) identified how the planned smart grid investment would bring about new opportunities and benefits. However, a good deal of variability exists among the utilities in classifying the smart grid deployment that has happened already – with at least one utility describing their smart grid deployment as something they have been engaging in for years (PG&E), and the others making it sound like smart grid deployment would start in earnest with the implementation of the plan (SCE).



#### **b. Overview: Strategy Sections**

In general, all three utilities developed strong strategic plans for deploying the smart grid in their service territories, relying both on the implementation of existing projects and an assortment of new investments / projects. Strategy sections tended to be non-specific, leaving specifics to the roadmap section, or narrowly following the organization recommended in the CPUC implementing decision. Overall, the strategies of the three utilities received high marks by EDF as we applied the scorecard, with the highest scores going to plans that 1) identified how utility smart grid investment decision making occurred or would occur, and 2) discussed how the smart grid strategy was tied to service territory specific infrastructure needs.

#### **c. Overview: Metrics Sections**

The three utilities met the PUC requirements to report on specific, pre-identified metrics, but did little more than that. Their reliance exclusively on the consensus metrics at this point tells only a small portion of the story regarding the progress and likely benefits from their smart grid deployments: all three utilities are lacking key information in this category. One utility (SDG&E) did discuss a willingness to develop new metrics with stakeholders in the future, and thus elevated what would have been a slightly lower score in this area. Additionally, all three plans' cost / benefit sections included methodology very close to what would be needed to develop additional environmental metrics, making it clear that developing metrics over the course of this proceeding is entirely possible.

#### **d. Overview: Baseline Sections**

The utilities generally complied with the CPUC requirement that they characterize their baseline conditions as it relates to the smart grid. There were, however, considerable differences among the utilities with respect to 1) how much actual data they provided to substantiate qualitative assessments, and 2) the extent to which they considered projects in development now to be in the overall baseline assessment. For example, while two utilities (PG&E and SDG&E) provided detailed data about the generation mix of power they sell, from

which environmental impact could be evaluated, SCE provided little such data. Additionally, whereas two utilities (PG&E and SCE) included projects in all stages of deployment in their baseline, SDG&E tended to follow a stricter baseline assessment related to current projects.

#### **e. Overview: Roadmap Sections**

The roadmap sections of the three utility smart grid deployment plans fell quite short of EDF's expectations and will likely need considerable development to meet the requirements of the CPUC decision. Although we recognize that smart grid technologies will continue to develop as the grid transitions to a more responsive and consumer driven condition, and therefore it may be difficult to create a roadmap with defined targets or goals, plans need to 1) be specific enough for the CPUC and the public to know what the desired end result is, 2) allow for tracking utility progress toward that result, and 3) be flexible enough to absorb innovations as they arise.

Whereas the roadmap sections generally identified desired smart grid implementation endpoints, they also lacked quantified goals or values upon which to track deployment progress. Words such as "more" and "better" and "most" were used rather than quantity words like "all" or "X %" or "Y number of customers" – therefore it will be nearly impossible to use the roadmap sections to inform actual deployments or track whether deployments are delivering the promised benefits. While at least one utility deployment plan benefit section did document a considerable amount of cross-cutting information that otherwise could have been included in their roadmap (PG&E), such estimates were treated as potential outcomes rather than targets, and therefore cannot count as roadmap endpoints. The highest scores in this section (though all were low) were given to plans that referred in some way to targeted endpoints or that contained provisional mid-term deployment goals.

#### **f. Overview: Cost/Benefit Sections**

EDF's Framework did not evaluate or provide a score for the cost or benefit sections of the utility deployment plans. However, since cost and benefit estimates are important for understanding utility decision making and roadmap endpoints, these sections were read closely

and compared to one another. In general, EDF found little consistency among the utilities' cost and benefit evaluations, making it difficult to compare their returns on smart grid investments from a consumer or environmental perspective. For example, while one utility (PG&E) reported only incremental investments from smart grid deployment planning, SCE and SDG&E reported total investments and benefits. Additionally, while two utilities reported estimated greenhouse gas and criteria pollutant reductions associated with deployment, (PG&E and SDG&E), SCE reported entirely different benefits values like avoided peak generation and demand response program enrollment. These discrepancies argue for a larger portfolio of consistent benefits metrics across utilities.

## **V. ANALYSIS BY UTILITY: SOUTHERN CALIFORNIA EDISON**

### **a. SCE: Vision Discussion**

Southern California Edison's smart grid deployment plan identified a strong and cohesive vision for the utility, complete with narrative of the value and promise of smart grid technologies for California's future. It is evident that SCE's vision not only incorporates the need to comply with the requirements of SB 17 and other California laws, but also sees the smart grid's broad range of potential benefits. SCE's concise vision for the smart grid is found on page 30 of its plan:

*"SCE's vision of a smart grid is to develop and deploy a more reliable, secure, economic, efficient, safe and environmentally-friendly electric system. This vision covers all facets of energy from its production to transmission, distribution, and finally its efficient use in homes, businesses and vehicles. This smart grid will incorporate high-tech digital devices throughout the transmission, substation and distribution systems and integrate advanced intelligence to provide the information necessary to both optimize electric service and empower customers to make informed energy decisions."*

In all, SCE included almost all the elements that EDF considers critical for a smart grid utility vision – following CPUC instructions to all utilities to discuss the plans through the perspectives of making a Smart Market, Smart Customer and Smart Utility. However, SCE's vision seemed limited to only the CPUC required elements, resulting in a plan that could leave behind some of the potential benefits of the smart grid. Specifically, for SCE to achieve a higher

score, the vision section will need a discussion of elements such as customer equity, environmental impacts on land and solid waste, and the ability of the customer to have a choice in generation fuels.

#### **b. SCE: Strategy Discussion**

Whatever SCE may have lost in its vision section by primarily focusing on required elements, it made up for in its deployment strategy section, releasing the strongest strategy of all three IOU's. SCE's strategy includes a clear explanation of how they would determine the infrastructure requirements to meet their vision, address issues such as evolving standards, and continue to assess the readiness of the overall deployment. The inclusion of a chart to tell this story helped make the strategic agenda of the utility very clear.

A large part of the SCE strategy discusses how the utility will use installed equipment and communications infrastructure to carry out further deployment of smart grid enabled programs like SmartConnect and AutoDR – a discussion similar to that in other utility plans. One key addition, however, is a broad discussion of how SCE plans to utilize the information collected in these programs to evaluate and improve future deployments – an approach we support. This iterative approach does limit, however, the utility's ability to assign detailed investment values or outline specific infrastructure investments for the years 2015 – 2020, making it somewhat more difficult to roadmap forecasted and / or conceptual projects.

#### **c. SCE: Metrics Discussion**

In general, SCE's metric section fell in line with the other two utilities by working solely with the consensus metrics. Although the utility did provide baseline values for each of the consensus metrics, and will presumably provide updated figures with each smart grid deployment planning update, the limited nature of the consensus metrics for tracking overall deployment planning progress means that SCE will not deliver a complete picture of its deployment process. Additionally, SCE provided no concrete goals for the consensus metrics beyond stating very general benefits within the roadmap section, further limiting the overall usefulness of their metrics for deployment planning.

As shown in the combined baseline and roadmap section, SCE has considerable information regarding their planned energy system, including energy supply characteristics. This is corroborated by the State requirement that the utility track and report its greenhouse gas emissions to the California Air Resources Board. Therefore, adding metrics, at a minimum, for greenhouse gas emissions and criteria pollutant emissions would be an easy task for the utility, regardless of whether these were consensus metrics or tied to a performance-based goal. The failure to include essential and achievable metrics beyond those arrived at by consensus was the primary factor in the utility plan receiving a low score.

#### **d. SCE: Baseline Discussion**

SCE reported a 2010 baseline for each of the consensus metrics that they reported, and offered a significant and detailed narrative of their current state of deployment smart grid infrastructure. By combining the baseline and roadmap sections into a single section, SCE was able to provide context for where the utility is today and where it is going. Further, SCE's roadmap implementation diagrams provided baseline values for nearly every infrastructure element discussed.

In general, however, SCE's plan was lacking a characterization of the environmental impact of its energy infrastructure from a greenhouse gas and criteria air pollutant standpoint and did not include a discussion of the current generation resource mix. Accordingly, if smart grid deployment is going to reduce overall emissions (as required by AB 32), there is no indication that SCE plans to determine what effect, if any, smart grid deployment will have on its overall resource mix or emissions profile.

#### **e. SCE: Roadmap Discussion**

None of the California smart grid deployment plans received high scores on their roadmap section because each was missing the same critical component – values and / or goals by which to measure progress. This resulted in a near zero score for each utility in the goals section.

EDF’s framework does incorporate a section score allowing for a more qualitative assessment of the plan and its ability to deliver the expected benefits of smart grid deployment. Though it was disappointing that SCE did not set quantitative goals for the metrics being reported, its baseline and roadmap sections did include summary diagrams that put their smart grid programs in the context of state policy goals and overall vision. Since these diagrams reference the utility vision and general targets, they can in some respects be considered quantifiable targets. For the utility to have received the maximum points in the section score, SCE would also have needed to supply interim targets.

**f. SCE Score: “B-”**

<b>B-</b>	<b>SCE Scorecard</b>	<b>Vision</b>	<b>Strategy</b>	<b>Metrics</b>	<b>Baseline</b>	<b>Roadmap</b>	<b>Total</b>	<b>Grade</b>
<b>I</b>	<b>Empower Customers</b>	0.8	0.9	0.8	1.0	0.2	3.7	C
<b>II</b>	<b>Platform for Technologies and Services</b>	1.0	1.0	1.0	1.0	0.0	4.0	B
<b>III</b>	<b>Demand Side Resources in Wholesale Markets</b>	1.0	1.0	0.4	1.0	0.5	3.9	B-
<b>IV</b>	<b>Reduce the Environmental Footprint</b>	0.8	1.0	0.4	1.0	0.0	3.2	D
	<b>Goal Score</b>	3.6	3.9	2.6	4.0	0.7	14.8	C
	<b>Section Score</b>	3.0	4.0	3.5	3.5	3.0	17.0	B+
	<b>Plan Score</b>	<b>6.6</b>	<b>7.9</b>	<b>6.1</b>	<b>7.5</b>	<b>3.7</b>	<b>31.8</b>	
	<b>Grade</b>	B	A+	C+	A	F		<b>B-</b>

## **VI. ANALYSIS BY UTILITY: SAN DIEGO GAS AND ELECTRIC**

### **a. SDG&E: Vision Discussion**

San Diego Gas and Electric's smart grid deployment plan includes a clear vision statement and commitment to deploy its smart grid in a rigorous manner with continued stakeholder outreach and input. SDG&E also details the stakeholder processes that went into developing the deployment plan itself. (Included in this stakeholder outreach was considerable interaction with EDF, as described in our Response dated August 4, 2011).

SDG&E lays out a vision reaching far beyond simple compliance with state policies – it commits to achieving the many benefits the smart grid can deliver in enabling stakeholder collaboration and sustainability.

As stated on page 17 of its Vision section:

*“San Diego Gas & Electric, in collaboration with key stakeholders, will create the foundation for an innovative, connected and sustainable energy future.”*

Within the Vision section, SDG&E provided medium term (2015) and longer term (2020) details for each of the 11 CPUC categories, a feature not replicated in other utility deployment plans, but which provides considerable insight into the expected deployment planning process. SDG&E also includes information on its existing smart grid deployment work, including a micro-grid project, providing useful context on the additional benefits that the deployment will provide, and a general accounting of SDG&E's past smart grid investments.

The SDG&E plan does not mention the utility's vision for improving the environment by reducing emissions of criteria air pollutants, water use, land use, or solid waste disposal.

### **b. SDG&E: Strategy Discussion**

SDG&E's smart grid strategy is arranged in a format that walks through the decision making process of the utility as a whole, while also narrowing in on the applicability of smart grid specific issues to strategic planning. By doing so, the plan contextualizes the overall smart grid strategy while also ensuring that smart grid specific strategies are discussed in depth.

Throughout, SDG&E provides a clear linkage between the utility smart grid programs and the eleven goals identified by the CPUC and listed in SB 17.

Like other utility plans, SDG&E's plan covered the utility decision making process and technology selection procedures, providing useful insight into why some programs were pursued while others were not. The strategy section also referenced ongoing consumer and stakeholder interaction to evolve and adapt the smart grid deployment to emerging issues and circumstances.

### **c. SDG&E: Metrics Discussion**

Like the other California IOU's, SDG&E only reported the metrics labeled as "consensus metrics." Although the utility did provide baseline values for these figures, and presumably will provide updated figures with each smart grid deployment planning update, the limited nature of the consensus metrics for tracking overall deployment planning progress means that SDG&E will not deliver a complete picture of its deployment process. Additionally, SDG&E provided no goals for the included metrics, further limiting the overall usefulness of the metrics for future planning purposes.

As discussed above, SDG&E agrees to work with stakeholders in the future to develop further metrics beyond the simple consumer metrics. This aspect was an important factor in elevating their score.

On environmental metrics: As shown in the baseline section, SDG&E has considerable information regarding its generation mix and emissions portfolio. Therefore, it would seem that adding metrics tied to greenhouse gas emissions and criteria pollutant emissions would be an easy task for the utility. Failure to pursue metrics beyond the consensus metric was the primary determinant in the utility plan receiving a low score.

To the extent that SDG&E included calculations for a wide number of economic and non-economic benefits from its smart grid deployment but did not agree to report those values as metrics for deployment progress evaluation or goal setting, such benefits cannot satisfy as metrics within this section.



#### **d. SDG&E: Baseline Discussion**

SDG&E's baseline section provided a detailed description of the current electrical grid and infrastructure in its service territory, including generation resources, transmission and distribution, and ongoing major smart grid or smart grid related deployments. SDG&E also provided descriptions of current customer data status, access to various programs and rates, and progress of its advanced metering deployment, to name a few.

The benefit of having such detailed information from SDG&E on its power generation resource mix and infrastructure is that it allows for an accurate assessment of the full range of benefits that the smart grid deployment can provide. Of the utility deployment plans released, SDG&E offered the most overall detail on installed equipment and infrastructure – arguably the most accurate baseline assessment of the current state of their energy system. Also, similar to other utilities, SDG&E has included some projects currently being deployed in its system (namely the OpEx 20/20 project), meaning that its baseline does include, to some extent, some functionalities that are yet to mature.

#### **e. SDG&E: Roadmap Discussion**

Like the other utilities, SDG&E did not score well on the overall roadmap section because it was missing the values and / or goals needed to measure progress. This equated to a near zero score for each utility in the goals section.

EDF's framework does, however, include a more qualitative assessment of the plan. SDG&E's roadmap section was structured around nine separate utility programs – each aligned with policy directives and stated visions for 2015 and 2020. Though most were stated in general terms, some were tied back to policy drivers and numeric goals laid out in earlier sections. This mapping of the roadmap to both interim and long term goals was a strong indicator of likely success by SDG&E in deploying the smart grid to achieve its overall vision, and was the primary reason SDG&E scored high on the roadmap section score. This mapping of expected progress to mid-deployment years was not included in any other plan and was a primary determinant for scoring this roadmap section above the others.

f. SDG&E Score: "B-"

<b>B - SDG&amp;E Scorecard</b>		<b>Vision Strategy Metrics Baseline Roadmap Total</b>					<b>Grade</b>	
<b>I</b>	<b>Empower Customers</b>	1.0	0.7	0.7	1.0	0.2	3.6	C
<b>II</b>	<b>Platform for Technologies and Services</b>	1.0	1.0	0.9	1.0	0.0	3.9	C+
<b>III</b>	<b>Demand Side Resources in Wholesale Markets</b>	1.0	1.0	0.4	1.0	0.0	3.4	C-
<b>IV</b>	<b>Reduce the Environmental Footprint</b>	0.6	1.0	0.4	1.0	0.3	3.3	D+
	<b>Goals</b>	3.6	3.7	2.4	4.0	0.5	14.3	C
	<b>Sections</b>	4.0	3.5	3.0	4.0	3.5	18.0	A
	<b>Score</b>	<b>7.6</b>	<b>7.2</b>	<b>5.4</b>	<b>8.0</b>	<b>4.0</b>	<b>32.3</b>	
	<b>Grade</b>	A+	A	D+	A+	F		<b>B -</b>

**VII. ANALYSIS BY UTILITY: PACIFIC GAS AND ELECTRIC**

**a. PG&E: Vision Discussion**

PG&E's smart grid vision represents a strong and unified direction for the utility, with a stated level of dedication to that vision extending all the way to upper management. This vision fully characterizes the range of benefits that smart grid can deliver, and is connected to the deployment strategy in a way that reveals the planners' thought process. However, the vision is more a list of existing and planned transmission and distribution system upgrades and investments than a plan for a newly designed grid system that will include emerging investments. While the list of planned foundational and program specific areas for investment is impressive, the fact that most are already fully planned or begun makes it less like a vision for the future than a plan for the present.

PG&E's smart grid vision statement can first be found on page 18 of its plan:

*PG&E's vision for the Smart Grid is to provide customers safe, reliable, secure, cost-effective, sustainable and flexible energy services through the integration of advanced communications and control technologies to transform the operations of our electric network, from generation to the to the customer's premise.*

Although PG&E's smart grid vision is closely tied to present day projects, the utility does also recognize that the smart grid deployment will be a dynamic process-- and that it is not an end in itself. This idea support two different concepts: 1) that smart grid deployment will be an ongoing, continually improving process; not a one-time effort fixed for all time, and 2) that the smart grid is not an end in itself but a platform enabling all kinds of other things. In support of

these concepts, PG&E presents a method for engaging in an iterative process, linked to its overall strategy, to ensure its smart grid deployment is proceeding as expected and delivering desired benefits. This is a great strength of their vision section.

#### **b. PG&E: Strategy Discussion**

PG&E's strategy for smart grid deployment followed the suggested outline and format offered by the CPUC in its smart grid decision. It discusses engaging customers, providing access to energy markets, and making the utility function more smartly. PG&E added its strategy for improving the foundation on which smart grid technology will communicate and operate. Unfortunately, it went into little depth beyond a general statement of the strategy or strategic priority and its match to a state policy objective. This was the primary reason the plan received a lower score compared to other utilities' strategy sections.

One aspect PG&E does detail in the strategy is its plan for foundational improvements to empower customers. Customer education, outreach and empowerment are a strong focus of the utility plan throughout, accounting for most of the utility's points in this area.

#### **c. PG&E: Metrics Discussion**

In general, PG&E's metric section fell in line with the other two utilities – working solely with the consensus metrics. Although the utility did provide baseline values for each of the metrics agreed on, and presumably will provide updated figures with each smart grid deployment planning update, the limited nature of the consensus metrics for tracking overall progress means that PG&E will not deliver a complete picture of its deployment process. Additionally, PG&E provided no goals for the included metrics, further limiting the overall impact of metrics on its deployment tracking and future planning.

As evidenced within the baseline section, PG&E has considerable information on its energy system, including detailed energy supply characteristics. This is corroborated by its reporting of expected reductions in greenhouse gas and criteria pollutant emissions associated with displaced energy generation. Therefore, adding metrics, at a minimum, for greenhouse gas and criteria pollutant emissions would be an easy task for the utility, regardless of whether these

were consensus metrics or tied to a performance goal. Failure to pursue any metric beyond the consensus metric was the primary factor in the utility plan's low score.

#### **d. PG&E: Baseline Discussion**

PG&E's baseline section provided a detailed description of the current electrical grid and infrastructure system in its service territory, including the generation resources, the transmission and distribution system and the ongoing major smart grid or smart grid related deployments. For the energy generation system and associated impacts, PG&E provided a clear and well-organized baseline portrait, allowing for an in-depth understanding of the utility resource mix. For ongoing deployments, PG&E classified projects in the baseline as either in-service or in-flight – though so many projects fit within these categories (approximately 28 large projects), it is hard to determine what is already installed and what is in development.

One benefit of having such detailed information from PG&E on its power generation resource mix and infrastructure is that it allows for an accurate assessment of the full range of benefits its smart grid deployment can provide. Of the utility deployment plans released, PG&E offered the most overall detail on each project currently in development. Also, similar to other utilities, PGE is embarking on "foundational and cross-cutting" improvements that will boost the value of smart grid investments and their ability to generate significant benefits.

Unlike other utilities, PG&E also provided a separate chapter titled "Smart-Grid Related Customer Programs." This chapter outlined the utility's many different customer-based programs, underscoring that customer involvement and empowerment is a main focus of their strategy and long-term plan.

#### **e. PG&E: Roadmap Discussion**

Like the other California utilities, PG&E received a low score on the roadmap section because it was missing the goals by which future progress could be measured. This equated to a near zero score for the Roadmap goals.

The EDF Framework also includes a qualitative assessment of the plan. While PG&E's roadmap lays out the 21 programs and projects it intends to complete, those project outcomes

were characterized as benefits, with non-specific end-points rather than quantified goals, leaving open the question of what criteria will be used to determine whether they are progressing as planned. Additionally, though the utility plan did provide diagrams with implementation timelines, these timelines lack quantifiable targets. For the utility to have received the maximum points in the section score, PG&E would also have needed to supply deployment targets.

i. PG&E's Score: "C"

<b>C</b>	<b>PG&amp;E Scorecard</b>	<b>Vision</b>	<b>Strategy</b>	<b>Metrics</b>	<b>Baseline</b>	<b>Roadmap</b>	<b>Total</b>	<b>Grade</b>
<b>I</b>	<b>Empower Customers</b>	<i>0.9</i>	<i>0.9</i>	<i>0.7</i>	<i>1.0</i>	<i>0.2</i>	<i>3.7</i>	C
<b>II</b>	<b>Platform for Technologies and Services</b>	<i>0.8</i>	<i>0.8</i>	<i>0.9</i>	<i>1.0</i>	<i>0.0</i>	<i>3.5</i>	C
<b>III</b>	<b>Demand Side Resources in Wholesale Markets</b>	<i>1.0</i>	<i>1.0</i>	<i>0.4</i>	<i>1.0</i>	<i>0.0</i>	<i>3.4</i>	C-
<b>IV</b>	<b>Reduce the Environmental Footprint</b>	<i>0.8</i>	<i>0.8</i>	<i>0.3</i>	<i>1.0</i>	<i>0.0</i>	<i>2.8</i>	F
	<b>Goal Score</b>	<b>3.5</b>	<b>3.5</b>	<b>2.2</b>	<b>4.0</b>	<b>0.2</b>	<b>13.4</b>	D+
	<b>Section Score</b>	<b>3.5</b>	<b>3.0</b>	<b>3.0</b>	<b>3.0</b>	<b>3.0</b>	<b>15.5</b>	C+
	<b>Plan Score</b>	<b>7.0</b>	<b>6.5</b>	<b>5.2</b>	<b>7.0</b>	<b>3.2</b>	<b>28.9</b>	
	<b>Grade</b>	B+	B	D+	B+	F		<b>C</b>

## VIII. CONCLUSION

As stated above, we consider these scores to be “midterm grades.” EDF has full faith that, with additional attention in this proceeding to developing their roadmap and metrics sections, each utility can receive an “A” on their final smart grid deployment plans. We look forward to working with the Commission and the three IOUs to ensure that these plans form a solid foundation for California’s clean energy future.

Respectfully signed and submitted on August 11, 2011.

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