

Application of San Diego Gas & Electric  
Company (U-902-E) for Adoption of an  
Advanced Metering Infrastructure  
Deployment Scenario and Associated Cost  
Recovery and Rate Design.

Application 05-03-015

**ERRATA TO**  
**CHAPTER 18**  
**(REDACTED VERSION)**  
**Prepared Rebuttal Testimony**  
**of**  
**TED M. REGULY**  
**SAN DIEGO GAS & ELECTRIC COMPANY**

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

**SEPTEMBER 7, 2006**

**Revised: SEPTEMBER 19, 2006**

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1 Chapter 18  
2 Prepared Rebuttal Testimony  
3 of  
4 TED M. REGULY  
5 SAN DIEGO GAS & ELECTRIC COMPANY  
6  
7

8 **I. Introduction**  
9

10 The purpose of this testimony is to respond to several claims and assertions made by the  
11 Utility Consumers Action Network (UCAN) and the Division of Ratepayer Advocates (DRA)  
12 witnesses in their prepared testimony submitted on August 14, 2006, specifically with regard to  
13 SDG&E's AMI Technology selection strategy. I will be sponsoring my own rebuttal as well as  
14 identifying and summarizing key rebuttal testimony of other SDG&E witnesses. Attached is a  
15 letter from Mr. Steve Pullins of SAIC (Author of EPIC study) to Mr. Scott Anders of EPIC  
16 which addresses several of UCAN's misrepresentations of a preliminary draft of the EPIC San  
17 Diego Smart Grid Study.  
18

19 **II. SDG&E's AMI Technology and Installation costs are 8% lower than PG&E's**  
20 **Commission approved costs and incorporate solid state meter technology**

21 Both DRA and UCAN compare SDG&E's AMI business case to Pacific Gas and Electric  
22 Company's (PG&E's) as filed in A.05-06-028 and approved by the Commission in D. 06-07-  
23 027. This is logical since PG&E is the first utility in California to undergo a full Commission  
24 review of an AMI proposal. However, it is important to note the major differences between the  
25 two proposals in order to effectively evaluate the two business cases side by side. The most  
26 important difference is that PG&E is retrofitting its electromechanical meters to accept an AMI  
27 communication module whereas SDG&E is proposing to install a new solid state meters with the  
28 communication module embedded in the meter. SDG&E calculates that the installed cost per  
29 meter in SDG&E's case is actually 8% lower than the costs for PG&E to retrofit it meters.

30 Table TMR 18-1 (Attachment A) compares SDG&E's AMI Technology and Installation  
31 costs to those approved by the Commission for PG&E. It is a direct comparison of PG&E's  
32 approved AMI Technology and Installation costs to those SDG&E provided to DRA in response  
33 to DRA Data Request No. 43 with modifications as noted.

1 As stated in DRA witness Geilen's prepared direct testimony (DRA, Chapter 1), DRA  
2 compares SDG&E's and PG&E's cost and benefits. For the reasons described in Mr. Kyle's  
3 testimony, SDG&E does not support using this approach for modeling SDG&E's business case  
4 cost effectiveness for reasons noted in his rebuttal testimony. SDG&E believes, however, that  
5 this method is appropriate for the purpose of comparing SDG&E to PG&E AMI system costs.

6 As shown in table TMR 18-1, SDG&E's estimated costs for its AMI system (including  
7 installation) is 8% lower than PG&E's costs for its AMI system (plus installation) on a PVR  
8 basis utilizing DRA's recommended analytical approach. In an *ex parte* notice dated July 14,  
9 2006, DRA criticized PG&E's intent to utilize retrofitted electro-mechanical as being 'old  
10 fashioned'.

11  
12 "DRA also explained that the PD errs in allowing Pacific Gas and Electric Company  
13 ("PG&E") to use old fashioned electro-mechanical meters and should instead require PG&E  
14 to use solid state, electronic meters in those instances where it plans to replace meters as part  
15 of its Advanced Metering Infrastructure project". With Attachment 1 specifically stating,  
16 "Solid state meters have more benefits and features than old mechanical types, are a proven,  
17 reliable technology, and are not significantly more expensive than the old fashioned meters".  
18

19 Given that SDG&E's AMI system and installation costs are 8% lower than PG&E's on a  
20 per meter basis, and its system provides as much or more functionality via a solid state electric  
21 meter, the Commission should find SDG&E's AMI System and Installation costs reasonable.  
22 Further, as specifically stated in Mr. Abbott's January 18, 2006 testimony in the matter of  
23 PG&E's A.05-06-028 at page 2-25 lines 20 -23, AMI System and installation costs in this range  
24 are reasonable:

25  
26 "The costs of the meter and its communication module appear to be generally in line with  
27 other recent AMI system procurements I am familiar with. The installed cost per meter point  
28 of the overall system also appears to be in the middle of the expected range."  
29

30 The Commission's final decision adopts that conclusion (PG&E's AMI Proceeding dated  
31 July 20, 2006 at page 63).

32  
33 "The project costs, as stipulated (see Table 1), are reasonable and within the range of a likely  
34 litigated outcome".

1  
2  
3 **III. SDG&E and DRA agree on the importance of prudent risk management.**  
4

5 Referencing Mr. Irwin's testimony at page 3-5 beginning with line 19, SDG&E agrees  
6 with DRA on the significance and importance of prudent risk allowance management and  
7 control. SDG&E agrees with DRA's philosophy of developing a risk allowance mechanism  
8 based on the Commission approved costs of the project. Given that neither SDG&E nor any  
9 other company has undertaken an AMI project of this magnitude, SDG&E will undoubtedly be  
10 faced with challenges over the project life no matter how well SDG&E manages the costs. Thus,  
11 SDG&E is hesitant to propose or agree to a specific cost cap mechanism until the Commission  
12 has authorized AMI project costs and schedule.

13 Referencing Mr. Irwin's testimony at page 3-7 lines 4 thru 7, SDG&E agrees that prudent  
14 risk management must be incorporated into a project of this size and scope, and any related  
15 vendor contracts. As part of SDG&E's contract negotiation process, SDG&E will inform its  
16 vendors how it expects risks to be anticipated, controlled, measured (metrics), evaluated, and  
17 addressed.

18 **IV. SDG&E's AMI technology selection process is sound.**

19 SDG&E's AMI technology selection strategy will provide the ratepayer needed  
20 functionality at the lowest overall cost, and will not result in the selection of a gold plated system  
21 as DRA suggests. Contrary to DRA witness Hadden's contention (Chapter 8), SDG&E's data  
22 accuracy and two-way bi-directional meter requirements neither increase overall project costs  
23 nor unrealistically reduce vendor selection/viability. Moreover, if these functions are eliminated  
24 SDG&E's costs would be reduced by 15%. On the contrary, if the Commission directs SDG&E  
25 to reduce meter reading reliability or eliminate bi-directional meters, ratepayers will pay the  
26 same costs as SDG&E has proposed and incur a lower level of meter reading service than  
27 currently exists and would receive no additional functionality to support net metering.

28 SDG&E is not chasing technology, nor is SDG&E participating in research and  
29 development of new AMI technologies that may or may not emerge. SDG&E believes that  
30 installing AMI technologies that currently exist and are cost effective will be a solid starting

1 point for the smart grid. Waiting for unproven, new and better technologies is not a viable  
2 business strategy.

3 **A. DRA’s Witness Hadden misrepresents SDG&E’s AMI technology request for**  
4 **proposal (RFP) functional requirements as cost ineffective and too “demanding”**  
5 **thus gold plated.**

6 As noted in Mr. Steklac’s rebuttal testimony, this assertion is incorrect and without basis.  
7 SDG&E’s AMI RFP selection process, utilizing a total cost of ownership method, will clearly  
8 lead to the selection of the most cost effective system for SDG&E’s customers. Mr. Hadden’s  
9 contention that including these requirements add costs without benefits is incorrect. For SDG&E  
10 the opposite is true. That is, the elimination or reduction in these requirements would in fact add  
11 costs. A reduction in the 99% meter read reliability requirement would lower SDG&E’s current  
12 level of customer service and would increase costs due to more bill estimations, field service  
13 calls, and customer complaints. The 2-way bi-directional meter requirement was not defined as  
14 an SDG&E critical requirement in its RFP scoring process and is simply an added benefit of the  
15 current generation of AMI enabled solid state meters. The current generation of solid state  
16 meters has critical functionality, such as, outage detection and integral data storage needed to  
17 support data integrity.

18 **B. DRA Witness Hadden asserts erroneously that reducing or eliminating**  
19 **SDG&E’s AMI technology Data accuracy and 2-way bi-directional meter**  
20 **requirements may reduce systems costs by 15%.**

21 **There is no basis for this claim.** As also noted in Mr. Steklac’s rebuttal testimony, Mr.  
22 Hadden’s claim that SDG&E may be able to reduce system costs by as much as 15% if it  
23 relaxes or removes it’s 99% meter read reliability and or bi-directional 2-way electric  
24 meter requirements is ill founded and without merit. As noted above, a 2-way bi-  
25 directional solid state meter does not increase costs, and no AMI vendor was eliminated  
26 [REDACTED] due to SDG&E’s 99% meter read reliability  
27 requirement. SDG&E’s AMI Technology solutions sets will meet this requirement while  
28 also having the lowest overall costs.

1  
2 **C. SDG&E agrees with DRA Witness Hadden that AMI that Technology**  
3 **acceptance testing is being essential to SDG&E’s vendor solicitation and**  
4 **contracting process and has incorporated these costs into SDG&E’s AMI**  
5 **business case.**  
6

7 As noted in Mr. Pruschki’s rebuttal testimony, SDG&E agrees with Mr. Hadden on the  
8 importance of thorough testing of the AMI system before acceptance by SDG&E. The costs  
9 associated with thorough acceptance testing which will stress the throughput of the system and  
10 are contractually binding is incorporated into our plans and AMI Business Case costs.  
11

12 **V. SDG&E is proposing to implement AMI as a complementary and a fundamental**  
13 **component of the Smart Grid.**

14 SDG&E’s AMI Technology selection supports San Diego’s future vision of an Electric  
15 Distribution “smart grid” as outlined in the yet to be released EPIC/SAIC study and report.  
16 SDG&E is evaluating and assessing AMI technology that is currently available and provides the  
17 functional benefits identified in SDG&E’s business case.  
18

19 **1. UCAN’s assertion that SDG&E’s AMI Technology strategy is “narrow scope”**  
20 **and ignores EPIC’s San Diego “Smart Grid” study is without basis and**  
21 **incorrect.**

22 SDG&E is a co-sponsor of this study and has been heavily involved in its development.  
23 As stated in Ms. Smith’s and Mr. Lee’s prepared direct testimonies and reaffirmed in their  
24 rebuttal testimonies, SDG&E’s AMI proposal before the Commission is foundational to San  
25 Diego County’s early adoption and implementation of an electric distribution “smart grid”. As  
26 noted in Mr. Pruschki’s testimony, SDG&E’s AMI system is designed to be upgradeable, with  
27 the ability to adapt as technology matures.

28 **2. UCAN has misrepresented the initial finding of the EPIC Smart Grid study**  
29

30 Attached to my rebuttal is a September 6, 2006 letter to Mr. Scott Anders, Director of the  
31 Energy Policy Initiatives Center (EPIC) from Steve Pullins, author of the above referenced  
32 study, summarizing revisions and clarifications made to the report in response to UCAN’s  
33 testimony in this proceeding. UCAN has taken out of context several references and drawn  
34 inappropriate conclusions from this draft study. The following excerpts are from Mr. Pullins’

1 letter, clearly demonstrating UCAN’s selective references and misrepresentations in their  
2 testimony.

3 **a. Study Treatment of the Relation between a Smart Grid and AMI (page 1 of**  
4 **Steve W. Pullins’ letter)**

5 UCAN AMI Testimony, page 5: *“The SAIC report, when released, is expected to*  
6 *confirm that a “smart grid” modernization is cost effective and practical for San*  
7 *Diego. However, its preliminary findings reinforced UCAN’s conviction that*  
8 *SDG&E’s AMU proposal is piecemeal and inappropriately limited.”*

9  
10 UCAN AMI Testimony, page 7: *“As will become apparently (sic) upon the*  
11 *release of the EPIC study, an AMI deployment serving as the foundation for other*  
12 *grid technologies could possibly be cost effective.”*

13  
14 Mr. Pullins’ then clarifies the report’s intent as follows:

15  
16 “Report clarification: The San Diego Smart Grid study as documented in the  
17 draft report (8 August 2006) assumed the California Public Utility Commission’s  
18 (CPUC) advanced metering infrastructure (AMI) initiative at SDG&E to be  
19 funded and implemented completely by 2010 per the filed plans of SDG&E as of  
20 the March 2006 when the study began.....”

21  
22 **b. Study Correction of the “Payback Period” Treatment and Explanation (page**  
23 **3, from Steve Pullins’ letter)**

24 UCAN AMI Testimony, page 7: “The study identifies over a dozen emerging  
25 applications that could offer three-five year paybacks; this compares favorably to  
26 SDG&E 34-year payback proposal.”

27  
28 UCAN AMI Testimony, page 14: “The study’s anticipated conclusion is an  
29 important one for this Commission: there are sufficient benefits, as societal or  
30 systems and in total, to justify a movement of the San Diego regional grid to a  
31 Smart Grid architecture. It prudently recommends a phased integration of at least



1 one deployment scenario that generates a 3-5 year payback period, however it  
2 admits that the sustained large benefits (> \$50M/yr) do not occur until about a  
3 dozen years later.”

4  
5 Mr. Pullins’ then clarifies the report’s intent as follows:

6  
7 “Report clarification: In two summary tables SAIC erroneously termed the  
8 reported time durations “Payback Periods”. Actually, these time durations are the  
9 “point of positive cash flow.....”

10  
11 **c. Study Recommendations of RD&D Projects (page 3, Steve Pullins’ letter)**

12 UCAN AMI Testimony, page 13: *“The EPIC study will specifically propose that*  
13 *SDG&E develop research, development, and demonstration (RD&D) projects to test*  
14 *some of these technologies, such as a two-phased test utilizing the SDG&E XpertSIM*  
15 *suite to do a detailed real-time simulation of a defined DER-based Microgrid pilot*  
16 *circuit / area examining potential benefits and trouble spots. It also suggests an*  
17 *advanced energy storage system pilot designed to operate in conjunction with a*  
18 *distributed generation unit, or other form of intermittent generation to develop the*  
19 *test control schema to prove operational capabilities and flexibility as well as the*  
20 *value proposition. The lessons learned on this project would additionally apply to the*  
21 *DER-based Microgrid project.”*

22  
23 UCAN AMI Testimony, page 14: *“The report authors also raise the “enormous”*  
24 *potential benefits of autonomous monitoring and control and encourage SDG&E*  
25 *to seize upon the California Energy Commission’s (CEC) expressed interest in*  
26 *developing distribution level grid agent software. They also recommend that*  
27 *SDG&E become engaged in a WiMAX pilot in conjunction with some local*  
28 *wireless companies.”*

29  
30 Mr. Pullins’ then clarifies the report’s intent as follows:

1           “Report clarification: The study does recommend specific RD&D projects to  
2 support the needed rollout of the improvement initiatives, but only names  
3 SDG&E specifically in the WiMAX RD&D. While it is highly likely that  
4 SDG&E will be involved in all four of the RD&D projects recommended, it was  
5 not the intent of the study to limit the RD&D projects to SDG&E ownership. The  
6 study is based on keeping open the option for other interested parties to develop  
7 RD&D projects in the San Diego region. Regarding the WiMAX RD&D, the  
8 recommendation is specific in that SDG&E would need to be involved in any  
9 third party development of WiMAX infrastructure (the likely scenario) in San  
10 Diego, to assure that it serves the monitor and control needs of the grid, which is  
11 likely to continue under SDG&E.

12  
13           **d. Study Clarification of the Assumption of AMI Rollout by 2010 in relation to**  
14           **Integration with a Smart Grid Strategy (page 4, Steve Pullins’ letter)**

15           UCAN AMI Testimony, page 14: While not an alternative proposal to SDG&E’s  
16 AMI initiative, the study suggests that had SDG&E integrated its AMI initiative with  
17 integration of Smart Grid technologies, the company could have created a far more  
18 robust, beneficial and cost-effective proposal.”

19  
20           Mr. Pullins’ then clarifies the report’s intent as follows:

21  
22           “Report Clarification: The San Diego Smart Grid Study assumes SDG&E AMI  
23 rollout is completed by the end of 2010. Of course, as an upfront assumption, the  
24 thirteen improvement initiatives in the study would be integrated with the AMI  
25 initiative as it is completed. “

26           This concludes my prepared rebuttal testimony

**ATTACHMENT A**

**Table TMR 18-1**

PG&E's AMI Costs		2005 PVRR		SDG&E's AMI Costs		2006 PVRR	
		Total*	Technology & Install	Total*	Technology & Install	Total*	Technology & Install
Cost Source:				Cost Source:			
Vahlstrom	1,016.8	1,016.8	Carranza	147.0	147.0		
Lau**	394.4	394.4	Charles	96.0	-		
Nguyen	129.3	129.3	Lee	4.0	-		
All others	647.9	-	Pruschki**	212.5	212.5		
			All others**	130.6	-		
Total 2005 PVRR	\$ 2,188.4	\$ 1,540.5	Total 2006 PVRR	\$ 590.1	\$ 359.5		
Escalated to 2006\$ (3%)	\$ 2,254.1	\$ 1,586.7					
Total Elec. & Gas Meters (Millions)	9.4		Total Elec. & Gas Meters (Millions)	2.3			
PVRR per E&G meter (\$/meter)	\$ 240	\$ 169	PVRR per E&G meter (\$/meter)	\$ 257	\$ 156		
			Percent higher/(lower) than PG&E	6.5%	-8.0%		
Total Electric Meters (Millions)	5.1		Total Electric Meters (Millions)	1.3			
PVRR per Elec meter (\$/meter)	\$ 429	\$ 302	PVRR per Elec meter (\$/meter)	\$ 454	\$ 277		
			Percent higher/(lower) than PG&E	5.5%	-9.2%		
*From PG&E Oct. 13, 2005 Application Amendment page 3							
**Excludes PG&E's Remote Turn on/off switches (\$76.4 M).							
**Excludes SDG&E's PCT's (Totaling \$17.9 M).							

PG&E Remote cutoff switches PVRR	\$	76.4	From PG&E workpapers Ex5Ch1 @ F1494
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SDG&E PCT PVRR	Pruschki	\$	13.5
	Gaines	\$	4.4
	Total	\$	17.9
			From DRA Data Request 40 Q4

**Notes:**

- SDG&E's witness Charles and Lee have no Meter Technology & Installation costs in their testimony.
- 3% inflation adjustment 2005\$ to 2006\$ consistent with DRA's workpapers.
- Total Elec. & Gas Meters (Millions) consistent with DRA's workpapers.
- Total Electric Meters (Millions) based on 2006 meters installed from PG&E & SDG&E workpapers.

**ATTACHMENT B**



6 September 2006

Mr. Scott Anders  
Energy Policy Initiatives Center (EPIC)  
School of Law  
University of San Diego  
5998 Alcalá Park  
San Diego, CA 92110

Subject: Revisions/Clarifications to the draft EPIC San Diego Smart Grid Study

Dear Scott:

In accordance with your request, SAIC has revised and/or clarified the subject study report in the following areas attributed in the "Summary of UCAN Testimony and Selected Issues Relating to Expenditures for San Diego Gas and Electric Company's 2006 Advanced Meter Initiative Application" to the EPIC San Diego Smart Grid Study:

1. EPIC SD Smart Grid Study treatment of the relationship between a Smart Grid and AMI (ref. pgs 5 and 7)
2. EPIC SD Smart Grid Study correction of the "payback period" treatment and explanation (ref. pg 7 and 14)
3. EPIC SD Smart Grid Study recommendations of RD&D projects (ref. pg 13)
4. EPIC SD Smart Grid Study clarification of the assumption of AMI rollout by 2010 in relation to integration with a Smart Grid strategy (ref. pg 14)

### **Study Treatment of the Relationship between a Smart Grid and AMI**

Reference:

"The SAIC report, when released, is expected to confirm that a "smart grid" modernization is cost-effective and practical for San Diego. However, its preliminary findings reinforced UCAN's conviction that SDG&E's AMI proposal is piecemeal and inappropriately limited." *UCAN AMI Testimony, page 5*

"As will become apparently upon the release of the EPIC study, an AMI deployment serving as the foundation for other grid technologies could possibly be cost-effective." *UCAN AMI Testimony, page 7*

Report clarification:

The San Diego Smart Grid study as documented in the draft report (8 August 2006) assumed the California Public Utility Commission's (CPUC) advanced metering infrastructure (AMI) initiative at SDG&E to be funded and implemented completely by 2010 per the filed plans of SDG&E as of the March 2006 when the study began. Because of the structure of benefits collected under the AMI initiative at SDG&E, demand response benefits were assumed to be

accounted for in the AMI project, and thus not available for benefits under the San Diego Smart Grid study. This necessitated assumptions to be stated in the report.

While the benefits modeling and draft report included AMI assumptions, the UCAN AMI testimony demonstrates the need for more explicit treatment of the assumptions around AMI. Therefore, SAIC developed a summary section near the front of the report to make more clear which key assumptions were used in the study.

The report's key assumptions are listed here to demonstrate the clarifications made:

- The Advanced Metering Infrastructure (AMI) initiative is assumed to be implemented and complete in the 2010 timeframe. All demand response benefits in the region are assumed to be derived from the AMI initiative and thus not considered a benefit in the Smart Grid analysis.
- Real time communications are not necessarily available to the consumer through the AMI initiative.
- The communications solution in this study assumes a Zigbee chip (or equivalent wireless enabling chip) is embedded in the AMI meter.
- Due to the uncertainty associated with the Sunrise PowerLink project, which may keep the design details in flux for several months, and because the San Diego Smart Grid Study is more focused on the local electric delivery network, EPIC decided to conduct this study independent of the proposed Sunrise PowerLink project.
- Funding for RD&D Projects is available and the projects are successful.
- An SDG&E substation automation program (multi-year) is already in progress.
- An SDG&E field SCADA switch rollout program is already in progress.
- A set of broadband over power lines (BPL), advanced transmission conductors, and sensor exploratory demonstration projects are in progress.
- Investments and corresponding benefits are to be evaluated on a regional perspective and not from the perspective on any individual entity.

The study assumption about AMI was necessary to assure that demand response benefits were not double counted between the AMI initiative and the San Diego Smart Grid study. The study only assumed the above three AMI bullets, and made no assumptions of the technology suite (or pro's and con's) being considered by SDG&E at any time in the study.

In addition, the study analysis did assume a complete communications infrastructure for all thirteen improvement initiatives, which may or may not be a duplication of the AMI initiative's communication plans, design, and cost. In essence, the study analysis assumed the necessary communications infrastructure for the Smart Grid would be part of and costed by the study analysis. This is because the communications infrastructure need was beyond that described in early AMI filings by SDG&E.

Since the San Diego Smart Grid study made extensive use of the US Modern Grid Initiative ([www.themoderngrid.org](http://www.themoderngrid.org)) systems analysis, principal characteristics, and key technology areas, AMI is a necessary enabling technology for any attempt to create a more intelligent and agile grid. Please refer to the descriptions of "Motivates and Includes the Consumer" and "Sensing and Measurement" documents under the Modern Grid Initiative.

## Study Correction of the "Payback Period" Treatment and Explanation

### Reference:

"The study identifies over a dozen emerging applications that could offer three-five year paybacks; this compares favorably to SDG&E's 34-year payback proposal." *UCAN AMI Testimony, page 7*

"The study's anticipated conclusion is an important one for this Commission: there are sufficient benefits, as societal or systems and in total, to justify a movement of the San Diego regional grid to a Smart Grid architecture. It prudently recommends a phased integration of at least the twelve projects discussed above as deployment programs. It is expected to offer at least one deployment scenario that generates a 3-5 year payback period, however it admits that the sustained large benefits (> \$50M/yr) do not occur until about a dozen years later." *UCAN AMI Testimony, page 14*

### Report clarification:

In two summary tables SAIC erroneously termed the reported time durations "Payback Periods". Actually, these time durations are the "point of positive cash flow". In the analysis, we calculate a cash flow for each improvement initiative and a summary cash flow of all improvement initiatives. This is important to understand when the complete "system" begins to pay for itself. Strictly, payback period is the time duration between the completion of a project and the point that accumulated benefits reach the point that the cost of the project is paid off.

Since our approach is to develop long-term deliberate programs of rollout of technologies, benefits actually start to accumulate before the completion of the improvement initiative. That is, the initiative is designed to have the earlier deployments in the programmed rollout generate benefits (societal and systems) before the later deployments are completed. This approach enables the region to receive the benefits stream earlier than a more traditional completion point approach. This renders the concept of "payback period" somewhat meaningless. This is why the time periods should more correctly be referred to as the "Point of Positive Cash Flow".

We have corrected the tables and included amplifying remarks to explain the treatment.

It is our opinion, that the point of positive cash flow combined with the point of large sustained annual benefits (>\$50M) provides the best picture of financial value of the Smart Grid.

## Study Recommendations of RD&D Projects

### Reference:

"The EPIC study will specifically propose that SDG&E develop research, development, and demonstration (RD&D) projects to test some of these technologies, such as a two-phased test utilizing the SDG&E XpertSIM suite to do a detailed real-time simulation of a defined DER-based



Microgrid pilot circuit / area examining potential benefits and trouble spots. It also suggests an advanced energy storage system pilot designed to operate in conjunction with a distributed generation unit, or other form of intermittent generation to develop the test control schema to prove operational capabilities and flexibility, as well as the value proposition. The lessons learned on this project would additionally apply to the DER-based Microgrid project." *UCAN AMI Testimony, page 13*

"The report authors also raise the "enormous" potential benefits of autonomous monitoring and control and encourage SDG&E to seize upon the California Energy Commission's (CEC) expressed interest in developing distribution level grid agent software. They also recommend that SDG&E become engaged in a WiMAX pilot in conjunction with some local wireless companies." *UCAN AMI Testimony, page 14*

**Report clarification:**

The study does recommend specific RD&D projects to support the needed rollout of the improvement initiatives, but only names SDG&E specifically in the WiMAX RD&D. While it is highly likely that SDG&E will be involved in all four of the RD&D projects recommended, it was not the intent of the study to limit the RD&D projects to SDG&E ownership. The study is based on keeping open the option for other interested parties to develop RD&D projects in the San Diego region. Regarding the WiMAX RD&D, the recommendation is specific in that SDG&E would need to be involved in any third party development of WiMAX infrastructure (the likely scenario) in San Diego, to assure that it serves the monitoring and control needs of the grid, which is likely to continue under SDG&E.

**Study Clarification of the Assumption of AMI Rollout by 2010 in relation to Integration with a Smart Grid Strategy**

**Reference:**

"While not an alternative proposal to SDG&E's AMI initiative, the study suggests that had SDG&E integrated its AMI initiative with integration of Smart Grid technologies, the company could have created a far more robust, beneficial and cost-effective proposal." *UCAN AMI Testimony, page 14*

**Report clarification:**

The San Diego Smart Grid Study assumes SDG&E AMI rollout is completed by the end of 2010. Of course, as an upfront assumption, the thirteen improvement initiatives in the study would be integrated with the AMI initiative as it is completed. However, the analysis did not include a comparison of the value and cost of integrating the AMI initiative within the suite of thirteen improvement initiatives because insufficient details were available to make a solid analysis of this effect. We suspect that an integrated approach would be more cost effective, but we do not know this for certain.



If you wish for us to incorporate these clarifications into the final report or have any additional comments to include, please let us know.

Best Regards,

A handwritten signature in black ink that reads "Steven W. Pullins". The signature is written in a cursive style with a long horizontal stroke at the end.

Steven W. Pullins  
Project Executive, EPIC San Diego Smart Grid Study  
Science Applications International Corp (SAIC)