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
Exhibit No.: ___________________
Witnesses: Mr. Ed Fong
Mr. Mark Gaines
Dr. Stephen S. George

PREPARED SUPPLEMENTAL TESTIMONY

OF

SAN DIEGO GAS & ELECTRIC COMPANY

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

June 16, 2006

SDGE

TABLE OF CONTENTS

PREPARED SUPPLEMENTAL TESTIMONY

OF

SAN DIEGO GAS & ELECTRIC COMPANY

I. EXECUTIVE SUMMARY

On May 19, 2006, Administrative Law Judge (ALJ) Gamson issued a ruling directing SDG&E to provide additional supplemental testimony by June 16, 2006, in support of Application (A) 05-03-015, SDG&E's Application for authority to deploy an advanced Metering Infrastructure (AMI) (the Ruling).[1] The Ruling instructed SDG&E to outline an adaptation of Pacific Gas & Electric's (PG&E's) residential and small commercial Critical Peak Pricing (CPP) proposal for its residential and small commercial customers based on the Statewide Pricing Pilot research project authorized in D.03-03-036 (Ruling, p.2). The Ruling also directed SDG&E to provide:

1. A side-by-side comparison of the current SDG&E proposal in A.05-03-015, the SDG&E adaptation of PG&E's proposal, and PG&E's actual proposal.
2. An analysis of the costs and benefits of SDG&E's adaptation of PG&E's proposal, as compared to SDG&E's current proposal in A.05-03-015.
3. A recommendation about whether the Commission should adopt a) SDG&E's adapted version of PG&E's proposal, b) SDG&E's current proposal or c) some variation or combination of PG&E proposal and SDG&E's current proposal (e.g., a combination of ¢/kWh credits and CPP rates) (Ruling, p. 3).

This supplemental testimony summarizes the demand response benefits and incremental costs associated with the scenarios outlined above and augments the high level AMI policy and benefits testimony, served March 28, 2006, of witness Fong (chapter 2), the Peak Time Rebate Program (PTR) testimony of witness Gaines (chapter 5) and the demand response impact testimony of witness George (chapter 6).

As demonstrated herein, the PG&E voluntary CPP proposal (or any realistic adaptation of that proposal) is not a good fit for SDG&E due to a variety of utility-specific circumstances. For example, SDG&E's average energy use and customer load shapes differ from PG&E's due to variations in climate and customer mix. Accordingly,

[1] The Motion was filed on April 28, 2006, by the Division of Ratepayer Advocates (DRA), The Utility Reform Network (TURN) and the Utility Consumers' Action Network (UCAN).

the expected average demand-response per customer is lower than in the PG&E service territory. This means that more customers must participate in SDG&E's demand-response programs to achieve the same magnitude of benefits as PG&E or other utilities might achieve. Consequently, SDG&E must design demand response approaches that maximize customer participation. The PG&E voluntary opt-in approach does not generate the number of mass-market participants as would SDG&E's proposed Peak Time Rebate program. Bottom line, a PG&E-like CPP rate in the SDG&E service territory would not provide demand response benefits large enough to offset the net cost of implementing AMI.

Excluding the benefits associated with customers with peak demands greater than 200 kW (of which the Ruling required no further analysis), the present value of demand-response benefits contained in SDG&E's March 28th filing equals $190 million. The estimated gross benefits associated with PG&E's approach in SDG&E's service territory equal only $80 million, or roughly 58 percent below the expected benefits of SDG&E's proposal. Moreover, given that marketing costs are higher with the PG&E approach, the difference in net benefits (i.e., the difference in gross benefits minus incremental marketing costs) is even greater. SDG&E's adaptation of PG&E's approach, which has higher prices for residential and small commercial customers based on SDG&E's avoided capacity costs, and higher participation rates for customers with peak demands between 20 and 200 kW based on an opt-out marketing approach, produces gross benefits of roughly $122 million, or about 35 percent less than SDG&E's proposal, and net benefits of only $111 million. Neither scenario produces benefits sufficiently large to maintain a net positive business case for AMI implementation. Given the existing AB1X rate cap on residential customer electric usage, only full implementation of the Peak Time Rebate (PTR) program for residential and small commercial customers produces benefits in the short run sufficiently large to offset the costs of AMI. [2]

Based on the analysis presented here, SDG&E recommends that the Commission approve the proposal put forth in SDG&E is March 28th filing. SDG&E's proposed PTR

[2] AB1X effectively placed a rate cap on residential electric usage for the first 130% of the electric baseline allowance. This rate cap applies to the total electric rate (distribution and energy commodity components) and is set at the January 2001 residential rate level. Approximately 70% of reresidential usage is subject to this rate cap at January 2001 levels.

rate provides residential and small C&I customers a transition to time differentiated rates and offers an incentive for these customers to provide demand response prior to the expiration of AB1X. Furthermore, we recommend that the CPUC and other stakeholders explore ways around AB1X so that it does not act as an absolute barrier to innovative dynamic rates during the period AB1X is in effect. Once eliminated, the CPUC should move quickly to approve default CPP tariffs for all customers in order to maximize cost-effective, demand-response benefits.

The remainder of this testimony is organized as follows: Section II supplements the testimony of Dr. George and provides a side-by-side comparison of the characteristics of current SDG&E proposal, the SDG&E adaptation of PG&E's proposal, and PG&E's actual proposal, as required in the Ruling. Section III supplements the testimony of both Dr. George and Mark Gaines and documents the new input values that are used to analyze the costs and benefits of each scenario. Section IV summarizes the benefit/cost analysis required by the Ruling, and Section V presents SDG&E's recommendations and supplements the testimony of Ed Fong.

II. SIDE-BY-SIDE COMPARISON OF DEMAND RESPONSE OPTIONS

Requirement 1 on page 2 of the Ruling directs SDG&E to make "a side-by-side comparison of the current SDG&E proposal in A.05-03-015, the SDG&E adaptation of PG&E's proposal, and PG&E's actual proposal." This section summarizes the characteristics of the three policy scenarios that are described in this requirement.

The current SDG&E proposal is described in detail in chapter 5 testimony of our March 28, 2006 filing. In brief, the SDG&E proposal assumes that:

- Shortly after AMI meters are installed (starting in 2009) all residential consumers will be offered an incentive to reduce energy use during the peak-period (from 11 am to 6 pm) on critical peak days. This Peak Time Rebate (PTR) incentive, equal to 65 ¢/kWh, is paid based on the difference between a reference value (intended to represent what usage would be in the absence of any behavioral change) and actual usage during the peak period on critical days. If a customer uses more than the reference value on critical days, his or her bill will be the same as it would have been under the standard rate. If a customer uses less, his or her bill will go down. Thus, consumers will not be "worse off" taking service under the PTR program than under the standard tariff.

- Small commercial customers with peak demands below 20 kW will be placed on a mandatory time-of-use rate once an AMI meter is installed. These customers also will be offered a PTR incentive of 65 ¢/kWh for reductions relative to a baseline quantity.
- Medium commercial customers, with peak demands between 20 and 200 kW, will be placed on a default CPP rate and have the option to switch to a TOU rate.
- Large commercial customers, with peak demands greater than 200 kW, will also be placed on a default CPP rate with the option to switch to a TOU rate.

PG&E's demand-response benefit estimates presented in its June 16, 2005 filing, were based on the assumption that all customers would be offered a voluntary CPP tariff, and that the Company's marketing campaign would target residential customers with central air conditioning and small commercial customers with energy use exceeding 20,000 kWh per year and spring/summer usage ratios exceeding 1.5 (in order to increase the likelihood that targeted customers own central air conditioning). PG&E assumed that acceptance of this rate would ramp up over a five-year period beginning in 2006 to a steady-state level of 35 percent of the residential target population and 27 percent of the commercial target population. The residential tariff was not revenue neutral for all customers, but rather only for customers in PG&E's two warmest climate zones (i.e., zones R and S, which encompass a higher saturation of the target population). This helped ensure that large users would be able to achieve higher bill savings and, as a result, would be more likely to accept and stay on the CPP rate. PG&E also assumed that customers would be offered bill protection in the first year after going on the new tariff, and that average acquisition costs would equal $90 for residential customers and $225 for commercial customers.

In addition to the major differences outlined above, there are a number of more subtle differences in assumptions between the PG&E and SDG&E proposals. The assumptions made in the two filings are summarized in the first two columns of Table 1 for residential customers and Table 2 for small commercial customers. Tables 1 and 2 also summarize the assumptions underlying the two primary scenarios that are examined here. The first scenario, delineated as the "PG&E Approach at SDG&E", is intended to satisfy the ALJ ruling requiring SDG&E to estimate benefits associated with "PG&E's actual proposal." The second scenario, delineated as "SDG&E Adaptation of PG&E Approach", is intended to meet the requirement to estimate benefits associated with "the

SDG&E adaptation of PG&E's proposal." The primary differences between the two scenarios are:

- In the "PG&E Approach At SDG&E" scenario SDG&E used exactly the same critical peak prices used by PG&E for each customer segment whereas in the "SDG&E Adaptation of PG&E Approach", scenario, SDG&E used a higher critical peak price based on SDG&E's belief that the avoided cost of capacity equals $85/kW-yr rather than the $45/kW-yr SDG&E value underlying the PG&E rate.
- In the "PG&E Approach At SDG&E" scenario, we also used the same participation rates for all three customer segments as PG&E used in its filing, whereas in the "SDG&E Adaptation of PG&E Approach" scenario, we applied an opt-out marketing approach to the medium C&I segment which leads to a much higher participation rate than with the opt-in approach assumed by PG&E.

Both of these differences result in higher benefit estimates in the SDG&E adaptation compared with the PG&E approach.

We also note some important differences between the assumptions underlying PG&E's June 16th, filing and the scenarios modeled here. For instance, in PG&E's filing, the peak period for residential customers was from 2 pm to 7 pm over a four-month summer period, whereas the peak period used here for all scenarios runs from 11 am to 6 pm over a six-month summer period. Another important difference between PG&E's filing and SDG&E's scenarios is in the value of avoided capacity which, as noted above, we assumed to equal $85/kW-yr and PG&E assumed to equal $52/kW-yr.[3]

For C&I customers with peak demands between 20 and 200 kW, SDG&E's March 28th, filing assumed that customers would be offered a CPP tariff on an opt-out basis, with the opportunity to switch to a mandatory TOU rate. Thus, the primary difference between the SDG&E proposal and PG&E's filing is the assumption of an opt-out versus an opt-in marketing approach and the resulting difference in participation rates. In the SDG&E filing, impacts were based on an effective[4] CPP price equal to 98.3 ¢/kWh and a participation rate equal to 71 percent.[5] For the "PG&E Approach at

[3] For reasons that are not clear, PG&E assumed a value of $52/kW-yr when valuing avoided cost, but $45/kW-yr when determining the CPP adder.
[4] These customers have both demand and energy charges. The demand-response benefits are based on changes in average prices, taking into account both demand and energy prices. These average prices are referred to here as effective prices.
[5] As indicated in Dr. George's testimony in the March 28, 2006 filing, the impact estimates are based on participation rates equal to the expected value of an asymmetrical probability distribution (see SSG-5, Table SSG 6-2). The expected value of this distribution is approximately equal to 71 percent.

SDG&E" scenario, we used the same 75 ¢/kWh adder PG&E used in its filing. With an effective base price equal to 19.1 ¢/kWh during the peak period (when peak demand charges add to the average price), this adder produces a CPP price equal to 94.1¢/kWh. We also used the same participation rate as PG&E, which ramps up over five years to a maximum value of 27 percent according to the same schedule as shown in Table 2 for the <20 kW customer segment. For the "SDG&E Adaptation of PG&E Approach" scenario, we assumed the same price and participation rate as in the SDG&E March 28, 2006 filing.[6]

Table 1
Assumptions for Residential Customer Scenarios

Variable	SDG&E March 28, 2006 Filing	PG&E June 16, 2005 Filing	PG&E Approach at SDG&E	SDG&E Adaptation of PG&E Approach
Tariff/Program offering	Voluntary Peak Time Rebate incentive	Voluntary, pure CPP (e.g., time-varying rate occurs on CPP days only)	Voluntary, pure CPP (e.g., time-varying rate occurs on CPP days only)	Voluntary, pure CPP (e.g., time-varying rate occurs on CPP days only)
Start date	2009	2006	2009	2009
First year when all meters are in place	2011	2011	2011	2011
Target population	All	Households with central air; also get small % of other households	Households with central air; also get small % of other households	Households with central air; also get small % of other households
Participation rate	70% of all customers with meters are assumed to participate in each critical event (e.g., participation ramps up only according to meter installation schedule)	For CAC households, % of meters installed each yr, ramping up according to following schedule: 10% in 2006; 15% in 2007; 20% in 2008; 30% in 2009; 35% from 2010 on. For non-CAC customers, 5% of all starting in yr 1	For CAC households, % of meters installed each yr, ramping up according to following schedule: 10% in 2006; 15% in 2007; 20% in 2008; 30% in 2009; 35% from 2010 on. For non-CAC customers, 5% of all starting in yr 1	For CAC households, % of meters installed each yr, ramping up according to following schedule: 10% in 2006; 15% in 2007; 20% in 2008; 30% in 2009; 35% from 2010 on. For non-CAC customers, 5% of all starting in yr 1
Critical peak rate/rebate	65¢/kWh relative to baseline quantity. Actual financial	60¢/kWh adder overlaid on top of PG&E's average price of 13.2¢/kWh produces a CPP price equal to	60¢/kWh adder overlaid on top of SDG&E's average price of 14.9¢/kWh for an effective price of	80¢/kWh adder overlaid on top of SDG&E's average price of 14.9¢/kWh for an effective price of

[6] Table 8 summarizes all of the relevant prices for this customer segment.

Table 1 Assumptions for Residential Customer Scenarios				
Variable	**SDG&E March 28, 2006 Filing**	**PG&E June 16, 2005 Filing**	**PG&E Approach at SDG&E**	**SDG&E Adaptation of PG&E Approach**
	incentive equals rebate plus average price of 14.9¢/kWh, for an implicit price signal of 79.9¢/kWh	73.1 ¢/kWh	74.9¢/kWh	94.9¢/kWh
Off-peak price	Not applicable	Off-peak credit equal to 2.992¢/kWh based on revenue neutrality calculation as described below. Produces an off-peak price equal to 10.21 ¢/kWh	Off-peak credit equal to 1.69 ¢/kWh based on revenue neutrality calculation as described below. Produces an off-peak price equal to 13.21 ¢/kWh	Off-peak credit equal to 2.34 ¢/kWh based on revenue neutrality calculation as described below. Produces an off-peak price equal to 12.56 ¢/kWh
Additional rate incentive	None	1¢/kWh credit applied to energy use in Tier 3 and above for participating customers—primarily used to boost bill reductions to entice target customers to stay. This does not affect DR impacts or benefits. This is paid for by non-participating customers by adding the cost to tier-3 and above usage. Must be adjusted over time as participation increases but this was not factored into any analysis.	1¢/kWh credit applied to energy use in Tier 3 and above for participating customers	1¢/kWh credit applied to energy use in Tier 3 and above for participating customers
Revenue neutrality	Not applicable	Revenue neutral for all customers in climate zones R&S calculated based on CPP share for all households in R&S (4.75%) compared with all non-CPP usage in 4-month summer for all households (95.25%).	Revenue neutral for all customers (not just CAC customers) for Inland climate zone.	Revenue neutral for all customers (not just CAC customers) for Inland climate zone.
Length of peak period	11 am to 6 pm	2 pm to 7 pm	11 am to 6 pm	11 am to 6 pm
Length of summer season	6 months	4 months	6 months	6 months
# of critical days	13 days spread over 6 months for analysis purposes (no limitation in	15 days spread over 4 months. The number of days would likely be subject to limitation written in the tariff.	13 days spread over 6 months. The number of days would likely be subject to limitation written in the tariff.	13 days spread over 6 months. The number of days would likely be subject to limitation written in the tariff.

Table 1
Assumptions for Residential Customer Scenarios

Variable	SDG&E March 28, 2006 Filing	PG&E June 16, 2005 Filing	PG&E Approach at SDG&E	SDG&E Adaptation of PG&E Approach
	practice)			
Starting values	Based on average usage for all households by climate zone for 7 hr peak period from 11 am to 6 pm and 6 month summer	Separate values by climate zone for CAC households and non-CAC households for 5 hr peak period from 2 pm to 7 pm and 4 month summer	Separate values for CAC households and non-CAC households by climate zone for 7 hr peak period from 11 am to 6 pm and 6 month summer	Separate values for CAC households and non-CAC households by climate zone for 7 hr peak period from 11 am to 6 pm and 6 month summer
Bill protection	Inherent in the program (e.g., bills can not go up, only down)	First year for customers based on single calculation at end of the summer. Does not affect DR benefits but will affect program costs, although these costs were not factored into the B/C analysis	First year for customers based on single calculation at end of the summer. Does not affect DR benefits but will affect program costs, although these costs are not factored into the B/C analysis	First year for customers based on single calculation at end of the summer. Does not affect DR benefits but will affect program costs, although these costs are not factored into the B/C analysis
Marketing costs	Program awareness marketing equal to $14 million for residential and C&I customers combined	PG&E assumed $18 million for general education/awareness + average acquisition cost of $90/participant which adds up to $48.2 million for residential customers. This estimate only counts acquisition costs for first 5 years of program.	Same level of program awareness costs as in SDG&E filing plus acquisition costs based on customer participation and $90/participant. PV of acquisition costs equal to roughly $7.2 million. As with the PG&E approach, this estimate only counts acquisition costs for first 5 years of program.	Same level of program awareness costs as in SDG&E filing plus acquisition costs based on customer participation and $90/participant. PV of acquisition costs equal to $9 million. This estimate assumes these costs will occur throughout the 30 year forecast horizon and they are inflated based on the CPI.
Avoided capacity costs	$85/kW-yr	52/kW-yr	$85/kW-yr	$85/kW-yr

Table 2
Assumptions for Small (<20 kW) C&I Customer Scenarios

Variable	SDG&E March 28, 2006 Filing	PG&E June 16, 2005 Filing	PG&E Approach at SDG&E	SDG&E Adaptation of PG&E Approach
Tariff/Program offering	Mandatory TOU combined with voluntary Peak Time Rebate incentive	Voluntary, pure CPP (e.g., time-varying rate occurs on CPP days only)	Voluntary, pure CPP (e.g., time-varying rate occurs on CPP days only)	Voluntary, pure CPP (e.g., time-varying rate occurs on CPP days only)
Start date	2009	2006	2009	2009
First year when all meters are in place	2011	2011	2011	2011

Table 2 Assumptions for Small (<20 kW) C&I Customer Scenarios				
Variable	**SDG&E March 28, 2006 Filing**	**PG&E June 16, 2005 Filing**	**PG&E Approach at SDG&E**	**SDG&E Adaptation of PG&E Approach**
Target population	All	A-1 customers with annual usage > 20,000 kWh and with 50% more summer usage relative to spring usage plus all A-6 customers	All customers with peak demand <20 kW and with annual usage >20,000 kWh	All customers with peak demand <20 kW and with annual usage >20,000 kWh
Participation rate	70% of all customers with meters are assumed to participate in each critical event (e.g., participation ramps up only according to meter installation schedule)	For target population, % of meters installed, ramping up according to following schedule: 2% in 2006; 7% in 2007; 17% in 2008; 22% in 2009; 27% from 2010 on. For <20,000 kWh customers, 2% of all starting in first year	For target population, % of meters installed, ramping up according to following schedule: 2% in 2006; 7% in 2007; 17% in 2008; 22% in 2009; 27% from 2010 on. For <20,000 kWh customers, 2% of all starting in first year	For target population, % of meters installed, ramping up according to following schedule: 2% in 2006; 7% in 2007; 17% in 2008; 22% in 2009; 27% from 2010 on. For <20,000 kWh customers, 2% of all starting in first year
Critical peak rate/rebate	Base average price equals 17.1 ¢/kWh. Mandatory TOU rate equals 21.3¢/kWh on peak, 16.4¢/kWh shoulder, and 14.2¢/kWh off peak. PTR rebate equals 65¢/kWh on top of TOU rate, for implicit price signal on peak on critical days equal to 86.4¢/kWh	75¢/kWh adder overlaid on top of PG&E's average price of 18.2¢/kWh for A-1 customers produces a CPP price equal to 93.9 ¢/kWh. A-6 customers got CPP price (layered on top of A-6 TOU rate) equal to 102.5 ¢/kWh.	75¢/kWh adder overlaid on top of SDG&E's average price of 17.1¢/kWh for an effective price of 92.1¢/kWh	85¢/kWh adder overlaid on top of SDG&E's average price of 17.1¢/kWh for an effective price of 102.1¢/kWh
Off-peak price	Not applicable	Off-peak credit equal to 2.720¢/kWh based on revenue neutrality calculation as described below. Produces an off-peak price for A-1 customers equal to 15.5 ¢/kWh	Off-peak credit equal to 2.60 ¢/kWh based on revenue neutrality calculation as described below. Produces an off-peak price equal to 14.54 ¢/kWh	Off-peak credit equal to 3.47 ¢/kWh based on revenue neutrality calculation as described below. Produces an off-peak price equal to 13.67 ¢/kWh
Additional rate incentive	None	0.5¢/kWh for participating customers	0.5¢/kWh for participating customers	0.5¢/kWh for participating customers
Revenue neutrality	TOU rate included in previous filing is revenue neutral.	Revenue neutral for all customers, not just the target population. Based on CPP share for	Revenue neutral for all customers in all climate zones, not just for the target population	Revenue neutral for all customers in all climate zones, not just for the target population

Table 2
Assumptions for Small (<20 kW) C&I Customer Scenarios

Variable	SDG&E March 28, 2006 Filing	PG&E June 16, 2005 Filing	PG&E Approach at SDG&E	SDG&E Adaptation of PG&E Approach
	Revenue neutrality is not applicable for PTR rebate	customers (3.5%) compared with all non-CPP usage in 4-month summer for all customers (96.5%).		
Length of peak period	11 am to 6 pm	2 pm to 6 pm	11 am to 6 pm	11 am to 6 pm
Length of summer season	5 months	4 months	5 months	5 months
# of critical days	13 days spread over 6 months for analysis purposes (no limitation in practice)	15 days spread over 4 months	13 days spread over 6 months	13 days spread over 6 months
Starting values	Based on average usage for all customers by climate zone for 7 hr peak period from 11 am to 6 pm, shoulder period from 6 am to 11 am and 6 pm to 10 pm, and off-peak period on all remaining hours for 5 month summer	Separate values by climate zone for target population and remainder of customers based on peak period from 2 pm to 6 pm.	Separate values by climate zone for target population and remainder of customers based on a critical peak period from 11 am to 6 pm	Separate values by climate zone for target population and remainder of customers based on a critical peak period from 11 am to 6 pm
Bill protection	Inherent in the program (e.g., bills can not go up, only down)	First year for customers based on single calculation at end of the summer.	First year for customers based on single calculation at end of the summer.	First year for customers based on single calculation at end of the summer.
Marketing costs	Program awareness marketing equal to $14 million for residential and C&I customers combined	PG&E assumed $18 million for general education/awareness for all customers + average acquisition cost of $225/participant which adds up $6.5 million for all of their A-1, A-6, A-10 and E-19 customers. They do not break the costs down just for customers with demands <20 kW.	Same level of program awareness costs as in SDG&E filing plus acquisition costs based on customer participation and $225/participant. PV of acquisition costs equal to roughly $1.7 million	Same level of program awareness costs as in SDG&E filing plus acquisition costs based on customer participation and $225/participant. PV of acquisition costs equal to roughly $2.1 million
Avoided capacity costs	$85/kW-yr	52/kW-yr	$85/kW-yr	$85/kW-yr

In addition to the two scenarios summarized above, the ruling directed SDG&E to recommend whether the Commission should adopt one of the two approaches or "some variation or combination of the PG&E proposal and SDG&E's current proposal." Given that the primary reason underlying SDG&E's proposal to use a rebate program rather than an opt-out CPP rate is the AB1X prohibition against changing prices on Tier 1 customers (with usage at no greater than the baseline allowance) and Tier 2 customers (with usage at 101% - 130% of the baseline allowance) energy use, we examined two additional scenarios: one in which the SDG&E PTR program is implemented until the AB1X constraint is no longer binding, and then all residential and small commercial customers are placed on a default CPP tariff with the ability to opt-out to a tiered rate for residential customers or to a TOU rate for small commercial customers. SDG&E also completed for comparison, two scenarios, which differ only with respect to the year in which we assume the AB1X constraint will be lifted. In one scenario, we assumed that customers would be placed on a default CPP rate starting in 2014 and in the other scenario we assumed the default CPP rate would go into effect in 2023.

III. INPUT ASSUMPTIONS REQUIRED FOR SCENARIO ANALYSIS

Requirement 2 of the ruling directs SDG&E to conduct "an analysis of the costs and benefits of SDG&E's adaptation of PG&E's proposal as compared to SDG&E's current proposal in A.05-03-015." (Ruling p.3) This analysis requires development of a number of new input values for key variables that drive demand-response. This section documents the development of those input values. The analysis results are presented in Section IV.

There are four primary input variables for which the values differ between the SDG&E proposal as filed on March 28th and the additional scenarios examined here:

1. Average energy use by rate period, climate zone and customer segment, since PG&E's approach targeted customers with specific characteristics (e.g., air conditioning) whereas the SDG&E proposal applied to all customers.
2. Price elasticities (which also vary because of the targeted marketing approach).
3. Prices.
4. Participation rates.

The derivation of values for these variables for each scenario is documented in the remainder of this section.

IIIa. Energy Use By Rate Period

The input values for energy use by rate period and customer segment used to estimate benefits for SDG&E's proposal are documented in Chapter 6 of the March 28th filing (see Tables SSG 6-7 through 6-10). Table 3 below shows the values for households with and without central air conditioning that underlie the targeted marketing approach used in the PG&E and SDG&E adaptation scenarios.[7] The values in Chapter 6 of the March 28th filing were based on data from SDG&E's primary load research sample for the year 2003.

The values for households with air conditioning in Table 3 below are based on SDG&E's special load research sample for centrally air conditioned households. The estimates from this sample for 2003 were calculated using population weights associated with the same ten weather stations that were used to produce the estimates for all households in each climate zone as reported in the March 28th filing. This sample was also stratified by customer size, and stratum weights were calculated based on September 2003 monthly usage values from SDG&E's customer information system database.

The values for households without air conditioning were derived residually, by assuming that the values for air conditioning households times the saturation of air conditioning in each climate zone plus the values for households without air conditioning times one minus the saturation of air conditioning must equal the values in Table SSG6-7. That is, the air-conditioning-saturation-weighted average of the values in Table 3 for each rate period must equal the average customer values in Chapter 6, Table 6-7.

Table 3
Average Monthly Summer Electricity Use for Residential Customers
(kWh/month)

Day Type	Period	Coastal & Mountain		Inland &Desert	
		With CAC	Without CAC	With CAC	Without CAC
Critical	Peak	23.1	7.3	27.4	8.9
	Off-Peak	33.2	20.8	37.4	24.9
Non-Critical Weekday	Peak	123.4	69.6	131.7	90.0
	Off-Peak	237.8	182.7	248.5	212.0
Weekend	All Day	185.1	130.5	204.7	149.5
Total		602.6	411.0	649.6	485.2

Estimates of average energy use by rate period and customer segment for C&I customers with peak demands below 20 kW are shown in Table 4. Average values for

[7] The models used to estimate demand-response impacts use average hourly starting values (e.g., kWh/hr) for each rate period, rather than total kWhs over the entire rate period.

customers with annual energy use above and below 20,000 kWh are needed in order to estimate the demand response benefits resulting from the targeted marketing approach used by PG&E. Estimates for total energy use by month for each sub-segment are based on data from SDG&E's customer information system database. The share of energy use in each rate period is based on the Company's load research sample and is assumed to be the same for each of the two sub-segments. Roughly 27 percent of SDG&E's 112,168 C&I customers with peak demands below 20 kW have annual energy use exceeding 20,000 kWh per year. This sub-segment accounts for approximately 71 percent of total energy use in the below 20 kW customer segment.

Table 4
Average Monthly Summer Electricity Use For C&I Customers With Peak Demands <20 kW
(kWh/month)

Day Type	Period	Coastal & Mountain		Inland & Desert	
		Less than 20,000 kWh	Greater than 20,000 kWh	Less than 20,000 kWh	Greater than 20,000 kWh
Critical	Peak	24.2	160.0	28.1	185.8
	Semi-Peak	25.3	167.4	23.0	152.2
	Off-Peak	16.3	107.7	12.5	82.5
Non-Critical Weekday	Peak	143.2	947.7	167.0	1105.4
	Semi-Peak	152.2	1007.5	146.0	966.6
	Off-Peak	109.1	722.2	84.5	559.3
Weekend	All Day	177.4	1174.3	144.7	958.1
Total		647.6	4286.9	605.8	4010.0

IIIb. Price Elasticities

The price elasticities that underlie the impact estimates for residential customers vary between customers in the target population who own central air conditioners and those in the remaining population who do not own central air conditioners. The derivation of the elasticity of substitution and the daily price elasticity for the average customer in each climate zone in SDG&E's service territory is documented in section IVb of Chapter 6 of the March 28th filing. The elasticity of substitution for households with air conditioning is estimated by inserting a value of 1 for the CAC variable in equation (1) on page SSG-16, and the value for households without central air conditioning is estimated by inserting a value of 0 for the CAC variable in equation (1). The same approach is used to estimate the daily elasticities for households with and without central air conditioning using equation 2 on page SSG-17. The resulting elasticity values are shown below in Table 5.[8]

Table 5
Price Elasticities for Residential Customers

Response Measure	Air Conditioning Ownership	Coastal & Mountain		Inland & Desert	
		Critical	Non-Critical	Critical	Non-Critical
Elasticity of Substitution	Yes	-0.125	-0.099	-0.130	-0.101
	No	-0.034	-0.028	-0.039	-0.030
Daily Price Elasticity	Yes	-0.052	-0.057	-0.047	-0.054
	No	-0.036	-0.041	-0.031	-0.054

We assume that the same price elasticities that were used for small C&I customers in the March 28th filing apply to both the target population of customers with annual use above 20,000 kWh as well as to those that are not specifically targeted. These values are summarized in Table SSG 6-14 in Chapter 6 of the March 28th filing.

IIIc. Prices

The basic approach to determining the prices that were used for residential customers in each scenario is summarized in Table 1. For the "PG&E Approach at SDG&E" scenario, we used the PG&E adder of 60 ¢/kWh for the peak-period on critical days overlaid on top of SDG&E's standard tariff (which has an average price in the base year equal to 14.9 ¢/kWh). This produces a critical peak price equal to 74.9 ¢/kWh. For analysis purposes, this price is assumed to be in effect on the top 13 system-load days which, given a 7-hour peak period from 11 am to 6 pm, equates to 91 critical peak hours.

The off-peak price is determined by assuming, analogous to PG&E's assumption, that the rate is revenue neutral for customers in SDG&E's inland climate zone, which has a higher saturation of customers in the target population (central air conditioning

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[8] The explanation of the derivation of elasticity values in Chapter 6 of the March 28th filing is incomplete. The equation coefficients reported at the top of page SSG-17 for the elasticity of substitution equation and on the top of page SSG-19 for the daily elasticity equation are used to compute the values for critical peak days only. They are based on the inner summer period regressions reported in the Statewide Pricing Pilot Final Report dated March 16, 2005, Appendix 16c, p. 150. The values for non-critical days are based on regressions using data from the entire six-month summer period, not just the inner summer months. The coefficients for these equations are contained in the March 16, 2005 report, Appendix 16d, p. 155. The three coefficients for the elasticity of substitution equation are, in order, -0.02726, -0.0022 and -0.07096. The three coefficients for the daily elasticity equation are -0.04195, +0.001606 and -0.01637.

saturation equal to 49 percent). The resulting off-peak credit of 1.69 ¢/kWh combined with the base rate produces an off-peak price equal to 13.21 ¢/kWh. In addition to the lower peak price, participants would also receive a participation credit equal to 1 ¢/kWh, which would apply to all use in Tier 3 and above during the summer months. This credit does not affect the demand-response benefit estimates because it is not applied to the prices. Rather, it is used to adjust the bill that is computed based on the time-varying prices reported above -- that is, the participation credit is a bill credit, not a price subsidy.

For the "SDG&E Adaptation" scenario, we calculated an adder equal to 80 ¢/kWh, which more closely reflects SDG&E's assumed avoided peak generation capacity cost estimate of $85/kW-yr (as compared to the $45/kW-yr value assumed by PG&E for the purpose of calculating the rate adder). Spreading this avoided cost across the assumed 91 critical peak hours produces an adder equal to 93 ¢/kWh. We assumed an adder of 80 ¢/kWh as a compromise between a value that is based on full avoided cost and one that might be more acceptable to consumers (and, thus, one that may encourage greater participation in a voluntary program). The resulting total peak-period price equals 94.9 ¢/kWh which includes both the critical peak adder and current average rates. The corresponding total off-peak price, based on the same revenue-neutral calculation as was used for the "PG&E Approach at SDG&E" scenario, is equal to 12.56 ¢/kWh.

Table 6 summarizes the prices (c/kWh) that underlie the demand response benefits for each residential customer scenario.

Table 6

Residential Average Prices

Scenario	Day Type	Average Tariffs	
		Peak	Off-Peak
Current average price	All	14.9	14.9
Peak Time Rebate	Critical	79.9	14.9
	Non-Critical	14.9	14.9
PG&E Approach at SDG&E	Critical	74.90	12.21
	Non-Critical	12.21	12.21
SDG&E Adaptation	Critical	94.90	11.55
	Non-Critical	11.55	11.55

SDG&E used a similar approach to develop prices (c/kWh) for small C&I customers for each scenario, except that the rates in this instance were assumed to be revenue neutral across all customers, not just those in the inland climate zone. The resulting prices are shown in Table 7.

Table7 Effective Prices for C&I Customers with Peak Demands <20 kW					
Scenario	**Day Type**	**Price**	**Peak**	**Partial-Peak**	**Off-Peak**
Current	**All**	**Effective**	17.1	17.1	17.1
TOU	**All**	**Effective**	21.3	16.4	14.2
PTR	**Critical**	**Effective**	86.3	16.4	14.2
PG&E Approach at SDG&E	**Critical**	**Effective**	92.1	14.5	14.5
	Non-critical	**Effective**	14.5	14.5	14.5
SDG&E Adaptation	**Critical**	**Effective**	102.1	13.6	13.6
	Non-critical	**Effective**	17.8	13.6	13.6

For C&I customers with demands between 20 and 200 kW, the same approach was used to develop the rates for the "PG&E Approach at SDG&E" scenario as was used for the small C&I customers. For the "SDG&E Adaptation of PG&E's Approach" scenario, we used the same rate that was used in SDG&E's March 28th filing. The prices for each rate period are summarized in Table 8.

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Table 8
Nominal and Effective Prices for C&I Customers with Peak Demands Between 20 and 200 kW
(¢/kWh)

Scenario	Day Type	Price	Peak	Partial-Peak	Off-Peak
Current Rate	**All**	**Nominal**	12.9	7.8	5.6
		Effective	19.1	14.0	11.9
SDG&E Filed	**Critical**	**Nominal**	92.4	6.4	5.5
		Effective	98.3	12.3	11.5
	Non-Critical Weekday	**Nominal**	7.2	6.4	5.5
		Effective	13.3	12.3	11.5
PG&E Approach at SDG&E	**Critical**	**Nominal**	87.9	7.8	5.6
		Effective	94.1	14.0	11.9
	Non-Critical Weekday	**Nominal**	12.9	14.0	5.6
		Effective	19.1	14.0	11.9
SDG&E Adaptation of PG&E's Approach	**Critical**	**Nominal**	92.4	6.4	5.5
		Effective	98.3	12.3	11.5
	Non-Critical Weekday	**Nominal**	7.2	6.4	5.5
		Effective	13.3	12.3	11.5

IIId. Participation Rates

Participation rates are a key driver of demand-response benefits and the need to obtain high participation levels was a key reason for why SDG&E proposed the PTR program in lieu of an opt-in CPP rate for residential and small C&I customers. Assumed participation rates in SDG&E's March 28th filing are documented in Chapter 5 of that filing. During the meter deployment period in 2009 and 2010, the assumed participation rates are applied to all customers that have meters installed prior to the summer of each year. That is, the percent of the population that participates in the PTR program or accepts a rate in each year is equal to the assumed participation rate times the percent of the population that has meters. The percent of the population with meters in each year is documented in Chapter 6 of the March 28th filing, Table SSG 6-19 (i.e., 0% prior to 2009, 42% in 2009, 77% in 2010 and 100% thereafter).

For the "PG&E Approach at SDG&E" scenario, SDG&E assumed the same participation rates as PG&E used in its June 16, 2005 filing. These rates are summarized in Tables 1 and 2. PG&E assumes that it takes several years before the maximum, steady-state participation level is achieved.

For the "SDG&E Adaptation of PG&E's Approach" scenario, the participation rates for the residential and small commercial customers are the same as for the "PG&E Approach at SDG&E" scenario. For C&I customers with demands between 20 and 200 kW, the participation rates are based on an assumption that these consumers would be placed on a default CPP tariff and be allowed to opt-out if they wish. This results in higher participation rates than in the PG&E scenario.

Tables 9 through 11 show the participation rates under each scenario for selected years. The tables also include values for the two additional scenarios described previously in which we assume that the PTR program is active until the AB1X constraint is lifted and then customers are "defaulted" to a CPP rate with opt-out provisions. The values in each table equal the percent of customers accepting the tariff or program in each year times the percent of customers with advanced meters. For example, the value of 4 percent in 2009 for residential customers in the PG&E scenario equals the assumed acceptance rate of 10 percent (as indicated in Table 1) multiplied by the 42 percent saturation of advanced meters in 2009.

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Table 9
Participation Rates for Selected Years for Residential Customers
(%)

Scenario	2009	2010	2011	2012	2013	2014 and beyond
SDG&E Base Case	29	54	70	70	70	70
PG&E assumptions	4	12	20	30	35	35
SDG&E adaptation	4	12	20	30	35	35
SDG&E recommended (AB1X ends in 2013)	29	54	70	70	82	82
SDG&E recommended (AB1X ends in 2022)	29	54	70	70	70	82

Table 10
Participation Rates for Selected Years for C&I Customers
With Demands Below 20 kW
(%)

Scenario	2009	2010	2011	2012	2013	2014 and beyond
SDG&E Base Case	29	54	70	70	70	70
PG&E assumptions	1	5	17	22	27	27
SDG&E adaptation	1	5	17	22	27	27
SDG&E recommended (AB1X ends in 2013)	29	54	70	70	77	77
SDG&E recommended (AB1X ends in 2022)	29	54	70	70	70	77

Table 11
Participation Rates for Selected Years for C&I Customers
With Demands Between 20 and 200 kW
(%)

Scenario	2009	2010	2011	2012	2013	2014 and beyond
SDG&E Base Case	29	54	70	70	70	70
PG&E assumptions	1	5	17	22	27	27
SDG&E adaptation	1	5	17	22	27	27
SDG&E recommended (AB1X ends in 2013)	29	54	70	70	77	77
SDG&E recommended (AB1X ends in 2022)	29	54	70	70	70	77

IV. ANALYSIS OF COSTS AND BENEFITS

Requirement 2 of the Ruling directs SDG&E to conduct “an analysis of the costs and benefits of SDG&E’s adaptation of PG&E’s proposal as compared to SDG&E’s

current proposal in A.05-03-015." This section summarizes the analysis of all relevant scenarios, which include SDG&E's original proposal, PG&E's proposed approach as applied to SDG&E, SDG&E's adaptation of PG&E's approach, and two additional scenarios that SDG&E examined in order to support our recommendations, which are summarized in Section V below.

Table 12 summarizes the present value of demand-response benefits associated with each of the scenarios described in the previous sections, and Table 13 shows the reduction in peak demand associated with each scenario.[9]

Table 12
Present Value of Demand-Response Benefits
(Millions of 2006 $)

Customer Segment	SDG&E March 28th Filing	PG&E Approach at SDG&E	SDG&E Adaptation	SDG&E Recommended (AB1X ends 2013)	SDG&E Recommended (AB1X ends 2022)
Residential	115.8	55.2	65.4	140.3	126.2
C&I <20 kW	23.8	6.5	6.7	25.4	11.8
C&I >20 kW <200 kW	50.3	18.2	50.3	50.3	50.3
Total	189.9	79.9	122.5	216.0	188.3

Table 13
Peak-Period Reductions in 2013
(MW at End-Use Level)

Customer Segment	SDG&E March 28th Filing	PG&E Approach at SDG&E	SDG&E Adaptation	SDG&E Recommended (AB1X ends 2013)	SDG&E Recommended (AB1X ends 2022)
Residential	101	50.5	60.1	101.0	101.0
C&I <20 kW	21.9	6.5	6.3	21.9	21.9
C&I >20 kW <200 kW	48.5	18.8	48.5	48.5	48.5
Total	171.4	75.8	114.4	171.4	171.4

A key conclusion from this analysis is that SDG&E's original proposal produces significantly greater demand-response benefits than does either the PG&E approach or SDG&E's adaptation of the PG&E approach. The present value of gross demand-

[9] The total peak-demand benefits reported in SDG&E's March 28th filing equals $235.3 million. This total includes a contribution of $45.3 million from C&I customers with demands greater than 200 kW. The ALJ ruling did not indicate any need to reconsider SDG&E's approach for this customer segment. Consequently, we have left this segment out of the analysis. The total demand-response benefits associated with each scenario would actually equal the values reported in Table 13 plus the $45.3 million that would be obtained from the default CPP tariff that SDG&E proposed for customers with peak demands greater than 200 kW in its March 28th filing.

response benefits associated with the PG&E critical peak prices and assumed participation rates is only about 42 percent of the benefits generated by the SDG&E proposal. Even with the higher critical peak prices underlying SDG&E's adaptation of the PG&E approach, and the higher participation rate in the medium C&I sector associated with this scenario, the present value of demand-response benefits equals only 65 percent of the benefit level achieved by the SDG&E approach, and the peak-demand reduction is only 67 percent of the value from the SDG&E approach. Given that a number of interveners have argued that PG&E's participation rates are, at best, optimistic and, at worst, unrealistic, more conservative participation assumptions would further reduce the benefit estimates associated with both scenarios. We believe that SDG&E's proposed approach, which maximizes demand-response benefits by implementing the PTR incentive program for residential and small commercial customers, produces significantly greater gross benefits than does a voluntary CPP tariff under any realistic set of participation assumptions.

The difference in net benefits between the SDG&E proposal and both the PG&E approach and SDG&E's adaptation of that approach is even greater than the difference in gross benefits, given that the marketing costs associated with promoting voluntary CPP tariffs are significantly higher than the marketing costs associated with the PTR program. Both the PTR program and voluntary CPP tariffs require expenditures to generate customer awareness. In SDG&E's March 28th filing, we included costs to generate awareness equal to roughly $14 million.[10] PG&E's estimate of costs for generating awareness among its customer population equals $18 million. For purposes of this analysis, we assumed that the level of expenditures for creating customer awareness generation in SDG&E's service territory would be roughly the same across all scenarios.

However, for the voluntary CPP tariff scenarios, there is an additional cost of customer acquisition that does not exist with the PTR program, since once customers are aware of the opportunity to reduce their bills by reducing peak-period reduction, no additional action is required to encourage participation. Estimates of acquisition costs for the PG&E and SDG&E adaptation scenarios are based on participation levels and the

[10] This value equals the present value of costs for mass media advertising ($12.653 million) and DR program marketing ($1.44 million) underlying Mr. Gaines testimony in Chapter 5 of the March 28th filing.

same estimates of average cost/participant that PG&E used in its filing ($90 for residential customers and $225 for C&I customers). However, the estimate for the "PG&E Approach at SDG&E" scenario includes acquisition costs for only for the first five years of the marketing period, when most customers go on the rate. This is consistent with the approach taken by PG&E in their filing. For the SDG&E adaptation scenario, we assumed that such acquisition costs would be incurred for all new customers over the entire forecast horizon. We also assumed that these costs would be subject to inflation at the rate of growth in the Consumer Price Index (CPI). Thus, under the PG&E approach, the present value of the estimated acquisition costs equals $8,844,262 across the residential and small commercial customer base whereas in the SDG&E adaptation scenario, the present value of total acquisition costs equals $11,083,681.

The gross benefit estimates contained in Table 12 must be reduced by the incremental cost of customer acquisition when comparing the relative benefits of these scenarios with the SDG&E proposal. Once the acquisition costs are accounted for, the PG&E approach produces net benefits that are only equal to 37 percent of the benefits from the SDG&E approach and the SDG&E adaptation scenario produces net benefits equal to 59 percent of the benefits from the SDG&E approach. Clearly, the net benefits associated with SDG&E's proposed approach are much greater than the benefits associated with either of the alternative scenarios.

As previously discussed, we also examined the benefits associated with scenarios in which the PTR program is implemented during the time when the AB1X rate cap is in effect and then the program is terminated in favor of placing all customers on default CPP tariffs with the ability to opt-out to an alternative rate. The only difference between the two additional scenarios is the assumption concerning when AB1X expires. In one scenario, we assume that this will occur in 2013. In the other scenario, AB1X is assumed to be no longer in effect by 2022. As seen in Tables 12 and 13, if AB1X were to expire in 2013 (or legislation is passed to change it), and customers are placed on a default CPP rate, the present value of demand-response benefits would increase by about 14 percent compared with the current SDG&E proposal. If AB1X were to expire in 2022, the demand-response benefits under this alternative approach would be essentially the same as under the SDG&E proposal.

V. CONCLUSION AND RECOMENDATIONS

The third and final requirement in the Ruling directs SDG&E to make "a recommendation about whether the Commission should adopt a) SDG&E's adapted version of PG&E's proposal, b) SDG&E's current proposal, or c) some variation or combination of PG&E's proposal and SDG&E's current proposal…" This section contains our recommendations.

Based on the analysis presented above, SDG&E recommends that the CPUC approve the proposal put forth in the Company's March 28th filing. SDG&E's March 28th proposal is the only one of the three scenarios that the CPUC required to be examined that produces benefits sufficiently large to offset the cost of the AMI investment. The PTR program provides a transition for residential and small C&I customers to time differentiated rates and provides an incentive for these customers to provide demand response prior to the expiration of the AB1X rate constraints.

Furthermore, we suggest that the CPUC and other stakeholders explore other ways to eliminate AB1X an absolute barrier to innovative dynamic rates during the AB1X effective period. Once the AB1X rate cap is no longer binding, the CPUC should move quickly to approve default CPP tariffs for all customers. Doing so will ensure that cost-effective, demand-response benefits are maximized.

This concludes SDG&E's Supplemental Testimony.