

Application of San Diego Gas & Electric  
Company (U-902-M) for Approval of  
Demand Response Programs and Budgets  
for the Years 2012 through 2014.

Application 11-03- 002

**CHAPTER IV**  
**WORKPAPERS FOR**  
**PREPARED DIRECT TESTIMONY**  
**OF**  
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**BEFORE THE PUBLIC UTILITIES COMMISSION**  
**OF THE STATE OF CALIFORNIA**

**March 1, 2011**  
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### **Allocation of System Support Activities to DR Programs**

Dollars budgeted for system support activities were allocated across all programs in the DR portfolio using the following method. First, the total program budget before allocation was calculated. Then, the proportion of each program's annual budget to the sum of the programs annual budgets was used to allocate the total support dollars across the programs.

The attached file titled "allocation of system support.xlsx" shows the calculations. Columns E, L and S list the program budgets before the allocation for years 2012, 2013 and 2014 respectively. Row 38 for each of these columns shows the total before-allocation budget for the portfolio. Row 40 shows the system support activities budget for each year (this is the amount to be allocated across the programs). Columns F, M and T show an adjustment to the program budgets which was necessary in order to perform the allocation correctly. The adjustment consisted of adding the program budget for the Summer Saver program. This program is administered by a third party and therefore the budget was not included in SDG&E's program database. Furthermore, this budget is considered confidential data. The adjustment also consists of removing the EM&V budget from the list of programs which will receive the allocated overhead. This is because the EM&V budget itself will later be allocated across the programs in a separate calculation.

Columns G, N and U show the allocation of the system support activities budget to each of the programs. The calculation is the proportion of annual program budget to total annual portfolio budget multiplied by the annual system support activities budget. These allocations are then added to the annual program budgets and the resulting annual total program budgets are shown in columns H, O and V. These budgets then sum to the total three-year budgets in column W.

For example, for the BIP program for 2012, the calculation is  $F7/F38$  multiplied by E40. The result is shown in cell G7. This amount is then added to the annual program budget in cell E7 and the total annual program budget, including the allocation for system support activities, is shown in cell H7. In columns J through V, the same process is repeated for 2013 and 2014.

### **Allocation of Other Supporting Activities to DR Programs**

The allocation of marketing and educational efforts and EM&V activities that support all programs are shown on the tab titled "allocations" in the SDG&E DR reporting template (available in the filing). Cells B3 through D4 show the annual budgets for the supporting activities to be allocated. The portion of the EM&V budget that supports all programs consists of dollars designated for customer research studies, DR forecasting application development, and two FTEs that support the DR M&E studies. Individual program M&E is already included in the program budgets.

Cells B10 through D13 show the total program budgets after other allocations were made as described below. Cells F10 through H13 show the allocations to be added to the program budgets. The calculation is similar to that described in the previous section for system support

activities: the proportion of annual program budget to the sum of the total annual program budgets is multiplied by the annual supporting activities budget.

### **Capacity Bidding Program (CBP)**

The budget for CBP needed to be split between the Day-Ahead (DA) option and the Day-Of (DO) option. The calculations are shown in cells A1 to D32 on the tab labeled “calcs” of the SDG&E DR reporting template. In cells B22 to D32, the budgeted dollars for program administration, M&E, and capital were split using proportions based on the forecasted MWs.

The capacity incentive dollars were calculated separately for each program option using the sum of the monthly tariff prices multiplied by the forecasted annual MWs. For the DA option, all customers were forecasted to choose the 1 to 4 hour event product. For the DO option, 60% were forecasted to choose the 1 to 4 hour event product and 40% to choose the 2 to 6 hour event product. Therefore, a weighted average was taken of these two sets of tariff prices. No customers were forecasted to be on the remaining event products. These calculations are shown in cells B7 to D7 for CBP-DA and in cells B10 to D10 for CBP-DO.

Energy incentives were calculated using the market price from the Avoided Cost Calculator (provided on the input tab of the DR Reporting Template) and expected MWh based on expected event duration and frequency. The calculations are shown in cells B8 to D8 for CBP-DA and in cells B11 to D11 for CBP-DO.

### **Technical Incentives (TI) Program**

#### Allocating TI Administrative costs

The TI budget was divided among the programs it supports, CBP, CPP-D, and DemandSMART. This allocation is done based on expected program MW. The calculations are shown on the tab labeled “calcs” of the SDG&E DR reporting template.

Before dividing the budget among these programs for admin, an adjustment needed to be made for engineering fees related to load shed tests. The admin budget includes these fees for the maximum expected load shed tests; however, the budget was adjusted to reflect only the number of load shed tests that would correspond with the expected MWs from the forecasted load impacts. In particular, the annual budgeted amount of \$550,000 for engineering fees to cover load shed tests for approximately 5 MW was reduced by a proportion of 1 minus an amount equal to the expected new MWs divided by 5. These calculations are shown in cells B36 to D37.

#### Allocating TI Incentives

Since the TI incentive is paid only once, only new MWs coming on to the program each year are used to calculate the incentives and the fees for load shed tests. Incentives were calculated as \$300 per kW with a 15% adjustment to account for recent M&E results that have shown that most customers deliver less load drop on actual events than they do on the load shed test. These

calculations are shown in cells B55 to D55 for CBP-DA,<sup>1</sup> in cells B56 to D56 for CBP-DO, and in cells B58 to D58 for the TI customers on CPP-D.<sup>2</sup>

An additional incentive is proposed for TI customers on CPP-D. This incentive is paid annually for customers remaining on the program. The incentive was calculated as \$30 per kW for cumulative new TI MWs forecasted for the CPP-D program. The calculations are shown in cells B60 to D60.

An additional cost was calculated for TI customers on the CBP program. Since the program had TI customers enrolled before the start of the 2012 to 2014 program cycle, and since these customers are forecasted to remain on the program through the 2012 to 2014 cycle, the continuing payment stream from previously amortized incentive payments needed to be included to offset the benefits claimed from the continuing customers. The calculation of these incentives can be found on the tab labeled “TI MWs” in the SDG&E reporting template. The amounts shown in cells R2 through T3 were included in the tests as already amortized capital costs for the CBP-DA and CBP-DO programs.

**Event Assumptions and Energy Savings**

Expected event hours reflect the programs’ event windows as described in the PIPs. These assumptions were used to calculate expected annual MWh for each program and can be found on rows 10 and 11 on the tab labeled “data inputs” in the SDG&E DR reporting template.

Energy Savings were calculated using the average rates provided by the SDG&E rate department. The applicable rate was multiplied by the expected MWh to determine energy savings. The average rates and the calculations for bill savings are shown in cells B30 to D32 on the tab labeled “data inputs” in the SDG&E reporting template. The average rates are also shown below in

Table 1.

**Table 1: Average SDG&E Customer Rates for 2012 to 2014**

	<b>2012</b>	<b>2013</b>	<b>2014</b>
Energy rate Residential	0.190	0.195	0.201
Energy rate Medium & Large C/I (includes demand charges)	0.143	0.147	0.152
Energy rate Small C/I	0.181	0.187	0.192

<sup>1</sup> Note that CBP Day-Ahead shows no incentives because no new TI customers are forecasted to enroll in this program during the 2012 to 2014 cycle. However, some TI customers are forecasted to continue on the program from 2011.

<sup>2</sup> The MWs and associated costs for TI customers on CPP-D were tested only as part of the overall portfolio as the CPP-D program was not tested for cost effectiveness in this application.

## **Factors**

For each program tested, five adjustment factors were calculated. The factors are shown on rows four through eight on the tab labeled “data inputs” in the SDG&E DR reporting template and in cells D40 through D44 on each program’s individual tab.

### **Factor A**

For Factor A, the tab labeled “A-Factor-Calc” in the file “A Factor-workpapers.xlsx” was used to calculate the A Factor for individual programs. On the first tab of this workbook, a summary of the methodology used for the calculations is provided. The assumptions used and the results are shown in Table 2.

**Table 2: Calculations for Factor A**

<b>Program</b>	<b>Months</b>	<b>Hours</b>	<b>Calls/Mo</b>	<b>Calls/Yr</b>	<b>Hrs/Call</b>	<b>Result</b>
BIP	1 to 12	11 to 18	Max 10 events		Max 4	0.68
CBP-DA (1 to 4 hrs)	5 to 10	11 to 19	Max 24 hours		1 to 4	0.60
CBP-DO (1 to 4 hrs)	5 to 10	11 to 19	Max 24 hours		1 to 4	0.60
CBP-DO (2 to 6 hrs)	5 to 10	11 to 19	Max 24 hours		2 to 6	0.62
CBP-DO average of 60% on 1 to 4 hours and 40% on 2 to 6 hours						0.61
SCTD	1 to 12	1 to 24	No limit	No limit	6	0.89
TI in CPP-D	1 to 12	11 to 18		18	6	0.89
PTR	1 to 12	11 to 18	No limit	No limit	7	0.92

### **Factor B**

For Factor B, 88% was used for day-ahead programs and 100% was used for day-of programs. These values were provided by the Commission in the Scoping Memo dated May 13, 2011.<sup>3</sup>

### **Factor C**

For Factor C, all programs received a C Factor of 100%. The Scoping Memo directed to use 100% for programs which can be triggered by the utility, and all SDG&E programs can be triggered by the utility.

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<sup>3</sup> Joint Assigned Commissioner and Administrative Law Judge’s Ruling and Scoping Memo (A.11-03-001), May 13, 2011.

#### Factor D

For Factor D, the default value of 0% was used unless the program participants received enabling technology to allow long-term reliable load reduction. For the programs that enroll TI customers, the D factor was calculated as the percentage of forecasted MW expected to come from TI customers. The calculation for this is shown on the tab labeled “impacts” on the SDG&E DR Reporting Template. Specifically, cells P17 to P19 show the result for CBP-DA, and cells P20 to P22 show the result for CBP-DO. Since all customers on the SCTD program receive enabling technology expected to yield benefits for at least ten years, this program has a D Factor of 100%. Likewise, the TI customers enrolling in CPP-D that are tested as part of the portfolio all have long-term enabling technology through the TI program. Therefore, these MWs also have a D Factor of 100%.

#### Factor E

For Factor E, all programs tested have an E Factor of 140%. The calculation of this factor is explained on the tab labeled “E-Factor” in the file “E Factor – workshpaper.xlsx”. This value was specified by the Commission in the Scoping Memo dated May 13, 2011.

#### **Permanent Load Shifting (PLS)**

The technology costs and estimated project lifetime was taken from the PLS Study<sup>4</sup>. Specifically, the study reported installation costs per kW by technology type (Table 18, page 108) and an assumed project lifetime of 15 years (page 50). As the study reported ranges for the technology installation costs, the midpoint of the range was used. The assumptions taken from the study and used by SDG&E as a result of this discussion with the Joint Utilities include the following:

- Average cost of technology for small thermal storage: \$2,730 per kW
- Average cost of technology for medium to large thermal storage: \$2,225 per kW
- Project lifetime: 15 years

Other assumptions used for the PLS cost effectiveness analysis are shown in Table 3 below. These assumptions are consistent with SDG&E’s March 1, 2011 application filing and SDG&E’s March 25, 2011 amendment filing.

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<sup>4</sup> Energy+Environmental Economics and StrateGen, Statewide Joint IOU Study of Permanent Load Shifting, November 29, 2010.

**Table 3: Analysis Assumptions**

	<b>2012</b>	<b>2013</b>	<b>2014</b>
Technology mix	Thermal Storage: 6% small; 94% med to large	Thermal Storage: 4% small; 96% med to large	Thermal Storage: 4% small; 96% med to large
Incentives (not to exceed \$500 per kW)	500,000	910,000	825,000
Expected peak capacity reduction (MW)	2.1	3.6	4.9
Length of shift time	6 hours		
Days per year (summer weekdays)	106		
Shift efficiency	100%		

For PLS, it was assumed that a shift would occur for six hours each summer workday, and the shift efficiency would be 100%. The adjustment factors used for the PLS analysis are the following:

- Factor A 100%
- Factor B 100%
- Factor C 100%
- Factor D 50%
- Factor E 29%

Factor E was used to account for the difference in energy price between the on-peak and off-peak period. It was calculated using the on-peak and off-peak energy market prices provided on the Input tab of the DR Reporting Template.