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SDG&E Solar Energy Project

CHAPTER III

ILLUSTRATIVE REVENUE REQUIREMENT

SAN DIEGO GAS & ELECTRIC COMPANY

Errata to

Prepared Direct Testimony
of
Christopher F. Yunker

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

January 7, 2009

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1 **I. INTRODUCTION**

2 The purpose of this testimony is to provide an illustrative revenue requirement which
3 reflects the aggregate impact of the SDG&E Solar Energy Project fully implemented as well as
4 to describe the assumptions that are the basis for the calculations. After Commission approval of
5 the SDG&E Solar Energy Project, San Diego Gas & Electric Company (“SDG&E”) will develop
6 and request approval for revenue requirements for each individual installation through a Tier 3
7 Advice Letter as described in Ms. Michelle Somerville’s testimony in Chapter IV.

8 While individual installation costs will vary, the revenue requirement included herein
9 provides the aggregate impact of all facilities installed under the SDG&E Solar Energy Project as
10 if they were implemented at \$7,000 per kilowatt direct current (“kW_{dc}”), the upper end of the
11 range as outlined in SDG&E witness Mr. Frank Thomas’ testimony in Chapter II.

12 The fundamental cost assumption that drives the revenue requirement is current market
13 prices on a \$/kW_{dc} installed basis reflected in California Solar Initiative (“CSI”) data. The
14 assumption is also made that individual installations will receive Federal Investment Tax Credits
15 (“ITC”). To the extent that ITCs are available to the market as a whole it is SDG&E’s intent to
16 realize the value of those ITCs to the benefit of ratepayers. The basis for the calculation of ITCs
17 for SDG&E’s revenue requirement is included in Section III, F of this testimony.

18 **II. DESCRIPTION OF INCREMENTAL COSTS**

19 The 5-year \$250 million program fully loaded costs are outlined in Table III-A and
20 include the cost components in the \$7,000 per kW_{dc} noted below as well as incremental labor and
21 non-labor costs through 2013 as outlined in Chapter II. Not included in the \$250 million
22 program development and installation costs for the 2008 through 2013 time frame are system
23 operations and maintenance (“O&M”) costs¹, inverter replacement and site specific
24 requirements.

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28 ¹ System O&M is estimated at \$25/kW-yr. This is based on the \$24/kW-yr (2006\$) in the Comparative Costs of California Central Station Electricity Generation Technologies escalated at 3% and will cover the cost of 2 full time equivalents (“FTE”).

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Table III-A							
Aggregate Fully Loaded Program Cost Components							
2008 – 2013 (\$000)							
2008\$							
	2008	2009	2010	2011	2012	2013	Total
Total Generation Plant²	0	48,295	48,295	48,295	48,295	48,295	241,477
Total Incremental Costs³							
	214	1,662	1,662	1,662	1,662	1,662	8,523
Incremental Labor	0	1,326	1,326	1,326	1,326	1,326	6,628
Full Time Equivalent Capital	0	795	795	795	795	795	3,977
Full Time Equivalent O&M	0	530	530	530	530	530	2,651
Incremental Non-labor	214	336	336	336	336	336	1,895
Non-Labor Capital	128	202	202	202	202	202	1,137
Non-Labor O&M	85	135	135	135	135	135	758
Total SDG&E Solar Energy Project Program Costs⁴							
	214	49,957	49,957	49,957	49,957	49,957	250,000
Ongoing System O&M⁵							
	0	102	204	306	408	510	1,531
Total Aggregate Costs⁶							
	214	50,059	50,161	50,264	50,366	50,468	251,531
Total Aggregate Capital	128	49,293	49,293	49,293	49,293	49,293	246,591
Total Aggregate O&M	85	767	869	971	1,073	1,175	4,941

² Costs included in the \$7,000/kW_{dc} fully loaded
³ Total Incremental Costs fully loaded. This does not include ongoing installation O&M.
⁴ The sum of Total Generation Plant and Total Incremental Costs.
⁵ Ongoing system O&M calculated at \$25/kW-yr
⁶ The sum of Total SDG&E Solar Energy Project Program Costs and Ongoing System O&M.

1 **III. Capital Costs**

2 Capital costs were calculated based on an installed cost of \$7,000/kW_{dc}. Inclusive in
3 these costs are PV modules, tracking systems, balance of system components, data acquisition
4 system and utility interconnection inclusive of sales tax. Capital costs also include project
5 development costs equal to 60%⁷ of the incremental labor and non-labor expenses. Capital cost
6 for inverter replacement will be incurred after 10 years of service and are estimated at \$900/kW
7 in 2008 dollars. The replacement cost of the inverter is not included in the installed cost of
8 \$7000/kW_{dc} and begins to show up in the revenue requirement for the first facilities in year 2019.
9 For incremental non-labor the loader used is 6.8% and incremental full time equivalent (“FTE”)
10 labor is loaded at 89.37%. The installation cost of \$7,000/kW_{dc} is loaded at 15.7%.

11 **A. Operations and Maintenance Costs**

12 The photovoltaic (“PV”) system O&M is estimated at \$25/kW-yr which includes services
13 as described in Chapter II of Mr. Thomas’ testimony. At full implementation O&M costs are
14 assumed to cover two FTEs. O&M costs also include 40%² of the incremental labor and non-
15 labor expenses. For incremental non-labor the loader used was 6.8%. Incremental FTE labor
16 was loaded at 89.37%.

17 **B. Allowances for Funds Used During Construction**

18 SDG&E will finance the SDG&E Solar Energy Project capital installations using debt,
19 equity and preferred stock in proportions matching its Commission-authorized capital structure.
20 SDG&E recovers new project financing costs through the allowances for funds used during
21 construction (“AFUDC”) mechanism while facilities are in Construction Work in Progress
22 (“CWIP”). Given the anticipated short construction schedule duration and illustrative nature of
23 the revenue requirement provided, no AFUDC was calculated here. However, should an
24 individual installation construction schedule necessitate AFUDC the revenue requirement
25 provided in a project’s Tier 3 Advice Letter would project AFUDC for the SDG&E Solar Energy
26 Project related costs that would be in CWIP. AFUDC would be applied until such a time as the

27 _____
28 ⁷ Typical splits for the development of distribution projects is approximately 80% capital and 20% O&M. Given greater uncertainty around the development of SDG&E Solar Energy Project installations a split of 60% capital and 40% O&M is used.

1 facility is completed and transferred into service, at which time AFUDC is no longer applied
 2 since the capital project then earns SDG&E's authorized return on rate base as outlined in
 3 section III, D of this testimony.

4 **IV. REVENUE REQUIREMENT**

5 The illustrative SDG&E Solar Energy Project revenue requirement indentified in Table
 6 III-B includes the forecasted generating plant capital and O&M costs as presented in Table III-A.
 7 The various components of the revenue requirement are discussed below. They include both the
 8 \$250 million SDG&E Solar Energy Project costs as well as system O&M.

Table III-B						
THE SDG&E SOLAR ENERGY PROJECT FULLY IMPLEMENTED ILLUSTRATIVE						
REVENUE REQUIREMENT (\$2008MM)						
	2008	2009	2010	2011	2012	2013
FF&U ⁸	0.0	0.1	0.2	0.3	0.4	0.5
O&M	0.1	0.8	0.9	1.0	1.2	1.3
Working Capital	0.00	0.02	0.02	0.02	0.02	0.03
Depreciation	0.0	2.7	5.3	8.1	10.8	13.7
Return	0.01	4.4	8.4	11.9	15.1	18.0
Federal Taxes	0.0	0.4	0.8	1.1	1.2	1.2
State Taxes	(0.0)	(0.3)	(0.7)	(1.2)	(1.7)	(2.2)
Property Taxes	0.0	0.6	1.1	1.6	2.1	2.6
Total Revenue Requirement	0.1	8.6	16.1	22.8	29.1	35.0

28 ⁸ Franchise Fees & Uncollectibles

1 The critical role to be played by the investor-owned utilities (“IOU”) in promoting the
2 development of new renewable resources and technologies has been expressly acknowledged by
3 the Legislature, which has authorized an increased incentive for utility ownership of renewable
4 generation. Section 454.3 of the Public Utilities Code permits an IOU to earn, under certain
5 circumstances, an incentive of 0.5% to 1.0% increased rate of return on investments in facilities
6 designed to generate renewable electricity.⁹ Under § 454.3, utilities may be provided this
7 increase in the rate of return otherwise allowed on electric plant for direct investment in facilities
8 if: “The facility is experimental and is, in the determination of the commission, reasonably
9 designed to improve or perfect technology for the generation of electricity from renewable
10 resources or to more efficiently utilize other resources in a manner which will decrease
11 environmental pollution from and lower the costs of the electricity generated.”

12 The 100 basis point incentive for renewable ownership is justified as the SDG&E Solar
13 Energy Project will build on current research to provide for a thorough and complete study as to
14 the benefits created by locating large concentrations of solar generation on SDG&E’s
15 distribution system. These real world demonstrations deploying 1 to 2 MW_{ac} of PV in multiple
16 locations will provide confirmation as to the value of distribution system benefits and under what
17 conditions those benefits are maximized. As noted in Mr. Frank Thomas’ testimony in Chapter
18 II distribution benefits are included in the site selection consideration. As noted in Appendix I to
19 Mr. Thomas Bialek’s testimony in Chapter II, the system will also provide valuable data for
20 forecasting hour and day ahead output based on weather forecasts as well as assist in developing
21 potential future requirements to schedule solar generation in California Independent System
22 Operator’s (“CAISO”) Participating Intermittent Resource Program (“PIRP”). In addition, solar
23 photovoltaics will decrease environmental pollution for each megawatt-hour produced by each
24 facility as noted in Mr. Frank Thomas’ testimony in Chapter II under the Environmental Benefits
25 section.

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⁹ All statutory references herein are to the Public Utilities Code unless otherwise noted.

1 **V. DEPRECIATION**

2 Depreciation expense is calculated using the straight-line remaining life depreciation
3 method consistent with Standard Practice U-4, Determination of Straight-Line Remaining Life
4 Depreciation Accruals. The CPUC issued this standard practice in 1961 as a guide for
5 determining proper depreciation accruals.

6 The depreciation lives assumed for the SDG&E Solar Energy Project are 10 years for
7 inverters and 20 years for PV modules, single axis tracking system, balance of system
8 components, data acquisition system and utility interconnection equipment. The resulting
9 depreciation rates are 10% and 5% respectively. The 10 and 20 year lives are based on industry
10 data and studies¹⁰.

11 **VI. Taxes**

12 **A. Property Taxes**

13 The forecasted property tax expenses for the SDG&E Solar Energy Project assets are
14 calculated by multiplying the projected assessed annual value of the assets as of the given year
15 by the estimated tax rate of 1.217 percent.

16 The assessed value is based on a Historical Cost Less Depreciation (“HCLD”) indicator
17 of value, which is the primary value indicator for rate base regulated utility property. HCLD is
18 the estimated cost of property that is subject to assessment by the State Board of Equalization
19 (“SBE”) less depreciation on this property. The deferred federal income tax reserve related to
20 taxable property further reduces the HCLD indicator.

21 **B. Income Taxes**

22 This section discusses the assumptions and methodology used to calculate state and
23 federal income taxes.

24 California Corporation Franchise Tax (“CCFT”) and federal income tax expense are
25 calculated based on net operating income before income taxes. The estimated federal and state
26 income tax expenses are identified in the forecasted SDG&E Solar Energy Project revenue
27 requirements provided in Table III-B.

28 ¹⁰ A well designed PV system can be expected to last in excess of 20 years and inverters approximately 10 years
as noted by the website for Sandia National Laboratory and National Renewable Energy Laboratory.

1 Federal income tax expense, including deferred income tax, is calculated by multiplying
2 the currently effective corporate federal income tax rate of 35 percent by applicable federal
3 taxable income. Similarly, state income tax expense is calculated by multiplying the statutory
4 rate of 8.84 percent of state taxable income.

5 Following established Commission policy, federal income taxes are computed on a
6 normalized basis. Deferred federal income taxes are calculated as the difference between book
7 depreciation and federal tax depreciation times the federal tax rate. The Accumulated Deferred
8 Federal Income Tax Reserve is included as a credit in rate base. State income taxes are
9 calculated on a flow through basis.

10 For the SDG&E Solar Energy Project federal tax depreciation is calculated in accordance
11 with the Tax Reform Act of 1986, as amended. State tax depreciation is based on the Asset
12 Depreciation Range system specified by California Law.

13 **C. Federal ITCs**

14 **1. Eligibility of IOUs for ITCs**

15 **Public Law 110-343, “The Emergency Economic Stabilization Act of 2008” (the**
16 **2008 Act) repealed restrictions on public utility property being eligible for the energy**
17 **credit and extended eligibility for ITCs to qualified property placed in service through**
18 **2016. Specifically, the 2008 Act amends the definition of energy property in Code Sec.**
19 **48(a)(3) by striking the following language: “The term energy property shall not include**
20 **any property which is public utility property (as defined in section 46(f)(5) as in effect on**
21 **the day before the date of the enactment [11/5/90] of the '90 Revenue Act.” IOUs cannot**
22 **currently garner federal ITCs on behalf of rate payers as the Renewable Energy Production Tax**
23 **Credit (“REPTC”) provided by sections 45(a)(2)(B) and (e)(4) of the Internal Revenue Code**
24 **requires that the electricity must be sold by the taxpayer to an unrelated person. New legislation**
25 **is pending that could extend the ITCs beyond 2008 as well as potentially include IOUs as**
26 **eligible entities. Other potential outcomes are that ITCs expire at the end of 2008 or new project**
27 **structures are identified whereby ITCs can be realized. While no avenue currently exists**
28 **whereby an IOU can own a solar asset and receive ITCs, SDG&E nonetheless seeks to realize**

1 ~~benefits of ITCs for ratepayers to the extent they are available to the market.~~ To that end,
2 SDG&E has included ITCs in the calculation of the SDG&E Solar Energy Project revenue
3 requirement ~~as if SDG&E were eligible for ITCs and assuming the ITCs are renewed~~ at the 30%
4 rate that is effective through the end of ~~2008~~ **2016**.

5 **2. Calculation of ITCs in Revenue Requirement**

6 Internal Revenue Code Section 46(f) provides two options for regulated utilities to reflect
7 ITC in ratemaking. SDG&E ~~is locked into~~ **originally elected** Option 2 which ~~is~~ **provides for** a
8 ratable reduction to tax expense in the cost of service **rather than a reduction to rate base**.
9 Therefore ITC benefits flow to customers ratably as a reduction to tax expense in cost of service
10 over the book life of the property that qualifies for ITC.

11 **Under the ITC legislation,** there is a required tax basis adjustment on ITC property.
12 **For tax purposes,** the depreciable basis of **ITC property** ~~for tax purposes~~ must be reduced by
13 50% of the ITC claimed. **Under FAS 109 of Generally Accepted Accounting Principles**
14 **(GAAP), this tax basis adjustment is treated as a recapture of a portion of the tax benefits**
15 **arising from the ITC. As a result of this basis adjustment, a timing difference between**
16 **book/tax recognition of depreciation expense is created.** ~~However, this is a permanent~~
17 ~~book/tax difference, so there are no deferred taxes attributable to the ITC claimed. The~~
18 ~~accounting rules under Financial Accounting Standards FAS 109 state: "basis differences that~~
19 ~~will not result in future taxable or deductible amounts are not temporary differences for which a~~
20 ~~deferred tax liability or asset is recognized."~~ ~~As a result of the accounting rules,~~ The deferred tax
21 asset ~~that would normally be~~ created by the basis difference **(which causes book depreciable**
22 **basis to exceed the tax depreciable basis)** is offset by an equal and offsetting deferred tax
23 liability **for the portion of the claimed ITC's that are to be recaptured each year.** Therefore,
24 the deferred taxes **in rate base** calculation is solely based on a deferred tax liability that sets up
25 and reverses over time due to the different ~~book~~ lives and ~~slower depreciation rates~~ **methods**
26 **used for book and tax purposes without any impact on rate base caused by ITCs. compared**
27 ~~to tax.~~

1 **D. Tax Lives**

2 In classifying property for tax depreciation purposes, SDG&E has followed IRS
3 guidelines under the Modified Accelerated Cost Recovery System (“MACRS”). Accordingly,
4 capitalized solar equipment is depreciated over a five year period using a 200 DB method for
5 federal tax purposes. For CA taxes a 5-year straight-line method is used.

6 **E. Franchise Fees & Uncollectibles**

7 Franchise Fees & Uncollectibles (“FF&U”) is the revenue requirement needed to pay
8 required franchise fees on electric sales and to recover estimated uncollectible expenses. The
9 FF&U factor used in calculating the proposed revenue requirement is 1.4%; SDG&E's current
10 FF&U gross-up factor used in developing electric commodity/generation revenue requirements.
11 SDG&E will update the FF&U factor used to calculate future proposed revenue requirements on
12 individual solar installations to reflect the factor adopted in its 2008 General Rate Case (A.06-
13 12-009).

14 **VII. WITNESS QUALIFICATIONS**

15 My name is Christopher Yunker. My business address is 8315 Century Park Court,
16 CP32F, San Diego, California.

17 I am employed by SDG&E as Principal Business Analyst in Financial and Strategic
18 Analysis. In this role I perform financial analysis and business development functions for a
19 variety of SDG&E capital projects and initiatives. Prior positions I have held at SDG&E include
20 Resource Planner with responsibilities including the evaluation of portfolio impacts of renewable
21 bids in SDG&E’s Renewable RFO, Technical Development Advisor with responsibilities
22 including due diligence for equity investment opportunities in renewable startups and Sr.
23 Financial Analyst for Fleet Services where I performed life cycle analysis for Fleet assets. Prior
24 to coming to SDG&E I worked for Sempra Energy Connections as a Financial Analyst where I
25 developed the business case for deploying micro turbines in cogeneration applications.

26 I received my Bachelor’s Degree in Mechanical Engineering from the University of
27 California at San Diego and an MBA from the University of Southern California with a focus in
28 Finance. I am a PE in mechanical engineering in the State of California. The first half of my

1 career I worked for GEA Power Cooling Systems as an Application Engineer and Marketing
2 Engineer. My responsibilities included the sizing and costing of air cooled condensers and
3 parallel condensing systems for central station power plants including combined cycle,
4 cogeneration and waste to energy plants.

5 I joined Sempra Energy in June, 2002. **I have not previously testified before the**
6 **CPUC.**

7 This concludes my testimony.

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