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SDG&E SOLAR ENERGY PROJECT
CHAPTER I
POLICY
SAN DIEGO GAS & ELECTRIC COMPANY

Errata to

Prepared Direct Testimony
of
James P. Avery

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

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1 **I. SUMMARY OF THE SDG&E SOLAR ENERGY PROJECT**

2 San Diego Gas & Electric Company (“SDG&E”) proposes in this application to
3 implement the SDG&E Solar Energy Project. SDG&E expects that this proposal will result in
4 up to 77 MW_{dc} of new installed solar capacity in the San Diego load basin. This proposal is
5 designed in such a way so that roughly two-thirds will be built, owned and operated by SDG&E
6 and one-third will be owned by host customers or independent third parties. For SDG&E’s
7 portion of the project, SDG&E proposes to build, own and operate up to 52¹ megawatts (“MW”)
8 direct current (“dc”) of distribution-connected solar photovoltaic (“PV”) generating facilities in
9 SDG&E’s load basin with a spending cap of \$250 million over a five year period. SDG&E
10 further expects that the opportunities the SDG&E Solar Energy Project will create for customers
11 to co-construct solar PV facilities with SDG&E under this proposal may result in the installation
12 of up to an additional 25 MW_{dc} of capacity under the California Solar Initiative (“CSI”) that
13 would not have otherwise been built. In total, this proposal may result in up to 77 MW_{dc} of new
14 installed solar capacity in the San Diego load basin.

15 As is described in more detail in the testimony of SDG&E witnesses Mr. Frank Thomas
16 and Mr. Thomas Bialek in Chapter II, the proposed SDG&E Solar Energy Project consists of
17 multiple individual installations of solar PV generating facilities each in the 1 - 2 MW_{ac}² size
18 range. SDG&E plans to utilize tracking technology that will maximize a PV system output
19 coincident with the predicted SDG&E system peak. SDG&E proposes to partner with hosts
20 offering sites with open areas and parking lots, such as shopping malls and local governments,
21 and with solar industry vendors and installers. The open areas and parking lots of the host
22 partners offer particular advantages in that they are located close to SDG&E’s load areas and are

23 ¹ The direct current capacity reporting basis is frequently utilized in the PV industry to report PV system output.
24 If capacity is expressed on an alternating current (ac) basis the dc to ac conversion will be based on the CEC
conversion of 1 watt (dc) = 0.67 watt (ac) detailed as follows:

25 A Guide to Photovoltaic (PV) System Design and Installation, CEC 2001, pg. 8-9

DC to AC inverter conversion:	.90
Production tolerance derate:	.95
Temperature derate:	.89
Dirt & dust derate:	.93
<u>Mismatch & wiring derate:</u>	<u>.95</u>
Total (product):	.67

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28 Using this conversion factor, 52 MW_{dc} equates to approximately 35 MW_{ac}.
² While 1-2 MW_{ac} is the primary target range, installations could be larger depending on specific site conditions.

1 in close proximity to locations where SDG&E's distribution system can accommodate systems
2 of 1 – 2 MW_{ac} in size. SDG&E also proposes to issue a competitive solicitation for the
3 equipment and installation of the systems.

4 If approved, the SDG&E Solar Energy Project will:

- 5 ♦ Promote the development of multiple commercial PV projects with the
6 participation of SDG&E, third party developers and customers supporting the
7 development of a PV market segment (installations between 1 and 2 MW_{ac}), that
8 is not currently being served through either utility or private investments; and
- 9 ♦ Deploy tens of megawatts of solar tracking technology to provide maximum
10 energy during the SDG&E system peak and thereby substantially enhancing the
11 value of the installations to serve peak demand.

12 **II. BACKGROUND**

13 **A. Existing State Policy Goals**

14 California leads the nation in efforts to protect natural resources and to promote the
15 development of renewable energy resources. State policy to increase the use of renewable
16 energy is demonstrated in many ways.

17 The renewable portfolio standard (“RPS”) program, which requires 20% of retail electric
18 sales be served by renewable resources by 2010 (“renewables goal”) is foundational. Building
19 on this, Governor Schwarzenegger signed landmark legislation establishing the Million Solar
20 Roofs Plan or CSI, the purpose of which is to develop 3,000 MW_{ac} of rooftop solar photovoltaic
21 installations by 2016³. This bold initiative codified the State’s commitment to the creation of a
22 self-sustaining solar market.

23 More recently, the State set forth greenhouse gas (“GHG”) emission reduction targets.
24 Assembly Bill (“AB”) 32 seeks to reduce statewide GHG emissions to 1990 levels by 2020, a
25 goal which will be achieved in large part through the displacement of fossil based generation
26 with renewable energy based resources.

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28 ³ D.06-01-024, *Interim Order Adopting Policies and Funding for the California Solar Initiative*, January 12,
2006, at 5.

1 In addition, the Commission and the California Energy Commission (“CEC”) have taken
2 a joint leadership role in implementing the renewable energy goals of the State. These agencies
3 initially demonstrated their commitment to increasing renewable resources in their joint Energy
4 Action Plan (“EAP”), adopted in 2003, in which they endorsed their intent to achieve the 20%
5 renewables goal by 2010, seven years ahead of the statutory deadline in effect at the time.⁴ In
6 their 2008 update to the EAP, the Commission and the CEC strengthened their commitment to
7 increasing the electricity generation from renewable energy in California.⁵ The agencies placed
8 particular emphasis on the potential benefits of solar energy “...since California has an
9 abundance of powerful sunlight.”⁶ The appeal of solar energy has also been recognized by the
10 Western Governors’ Association (“WGA”), which identified solar energy as a potential major
11 contributor to achieving the goal adopted by the WGA in 2004 of producing 30,000 MW_{ac} of
12 clean energy by 2015.⁷

13 In order to meet the State’s renewable and GHG goals the Commission has, among other
14 things, focused significant attention on implementing the RPS program, the CSI program and
15 encouraged investor owned utilities to build, own and operate renewable generation assets,
16 particularly solar PV⁸. Each of these policies reinforces the benefits of adding to the deployed
17 fleet of solar PV generation facilities in San Diego with SDG&E’s proposal.

18 **B. Existing State Programs**

19 The CSI provides substantial incentives to promote the development of solar power but
20 only for projects up to 1 MW_{ac} in size. To date, all of the solar installations installed under the
21 CSI located within the San Diego load basin are fixed panel installations, both flat and tilted,
22 installed on rooftops, ground mounts and parking lot structures. The CSI program is designed in
23 such a way as to reward the development of solar PV systems that are designed to maximize
24 their energy output. Unfortunately, installations developed under the CSI program are not

25 ⁴ California Energy Commission Energy Action Plan I (adopted May 2003). The 2017 compliance deadline
26 originally established in statute was subsequently accelerated to 2010. *See* Senate Bill (SB) 107, (Stats. 2006,
Ch. 464).

27 ⁵ California Energy Commission Energy Action Plan 2008 Update (February 2008) at 12
⁶ *Id.* at 13.

28 ⁷ *See*, Western Governors’ Association Clean and Diversified Energy Initiative 2005-2007 Progress Report at
<http://www.westgov.org/wga/publicat/CDEACReport07.pdf>

⁸ *See e.g.*, D.08-02-008 at 33-24 and D.07-12-052 at 79.

1 typically designed to also maximize their capacity output to be coincident with the utilities’
2 system peak periods.

3 The RPS, in contrast, allows investor-owned utilities to purchase renewable power from
4 commercial generators. While it is true that the RPS provides the flexibility to assess both
5 energy output and capacity output throughout the day, no solar projects of the 1 - 2 MW_{ac} size
6 have been built in SDG&E’s load basin through SDG&E’s RPS request for offer (“RFO”)
7 process whereby SDG&E solicits the purchase of renewable power. In fact, the vast majority of
8 the bids received under the RPS process are for resources that are located outside of the SDG&E
9 load basin.

10 Thus, a “gap” exists for constructing solar systems that are optimized for integration on
11 the distribution grid (1 - 2 MW_{ac} in size) and that are capable of maximizing their capacity output
12 coincident with the time that SDG&E experiences its system peak in SDG&E’s territory.
13 Installations of this size are either too large to take further advantage of the CSI incentives which
14 are limited to the first MW_{ac} of capacity installed and incent only maximizing energy production,
15 and are likely too small to be effectively bid into SDG&E’s RPS RFOs.

16 In addition to the CSI and RPS RFO initiatives, the Commission has urged the investor-
17 owned utilities to be creative in identifying other viable means of achieving their individual and,
18 by implication, the State’s RPS goals. In D.08-02-008 the Commission encouraged the utilities
19 “...to actively assess the feasibility of utility ownership, and pursue such ownership when and
20 where it makes sense.”

21 Consistent with the Commission’s guidance, in an effort to remedy the gap in solar PV
22 generation deployment identified above and to achieve maximum potential benefits from solar
23 resources in its service territory, SDG&E has developed the SDG&E Solar Energy Project to
24 target this gap as discussed in greater detail below and in Chapter II of SDG&E’s testimony, and
25 to effectively develop currently untapped solar resources that are either outside of the CSI or
26 have not been built through the RPS program in the San Diego load basin. In addition, the
27 SDG&E Solar Energy Project will facilitate the development by site hosts participating in the
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1 project of up to an additional 25 MW_{dc} of new photovoltaic installations under the State's CSI
2 program that would otherwise likely not have been developed⁹.

3 Through the SDG&E Solar Energy Project, host customers are provided the opportunity
4 to expand SDG&E's project sites through either direct ownership or through contracting directly
5 with merchant developers, so that they can utilize the same technologies deployed by SDG&E.
6 In this way, host customers will have the advantage of the economies of scale and the advantage
7 of utilizing standard designs deployed under the SDG&E Solar Energy Project. Plus, they will
8 be able to do so while also participating under the CSI initiative. This proposal will have the
9 effect of benefiting both the specific customer host and the SDG&E system at large. Putting this
10 another way, a dollar spent under the CSI initiative that produces more capacity at the time of the
11 SDG&E system peak versus a dollar spent on a system that does not, is worth more to all of
12 SDG&E's customers. The SDG&E Solar Energy Project will help focus CSI investment to
13 installations that provide a greater value to the system at large.

14 **III. THE SDG&E SOLAR ENERGY PROJECT SUPPORTS POLICY AND**
15 **RESOURCE PLANNING GOALS**

16 SDG&E secures the energy resources required to serve its customers through execution
17 of a Commission approved resource plan that provides maximum value and reliability to
18 SDG&E's customers, meets SDG&E's share of California's energy action plan goals, and
19 consists of a portfolio of energy efficiency, demand response, distributed generation, nuclear,
20 fossil and renewable generation as well as transmission infrastructure programs, which are
21 diversified through a combination of competitively procured energy resources and utility-owned
22 generation.

23 SDG&E supports California's policies aimed, generally, at spurring renewable energy
24 growth and, specifically, at promoting solar energy. With the natural abundance of solar energy
25 in the San Diego region, SDG&E is well situated to harness this resource. To date, the market
26 opportunities to exploit the full range of this solar potential have not materialized. The SDG&E
27 Solar Energy Project will develop a portion of this unexploited market. The SDG&E Solar

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⁹ To date, only 8.1 MW_{ac} out of the 27 MW_{ac} that was anticipated under the CSI program are in service.

1 Energy Project is being designed in such a way that it may provide San Diego with up to 77
2 MW_{dc} of capacity and associated energy directly connected to SDG&E's distribution grid and
3 host customer loads while at the same time maximizing output delivered during SDG&E's peak
4 hours. The 77 MW_{dc} is comprised of up to 52 MW_{dc} of SDG&E-owned systems through the
5 SDG&E Solar Energy Project, plus the development of up to 25 MW_{dc} of customer-owned
6 systems that the SDG&E Solar Energy Project ~~will~~ **may** facilitate under the CSI program that
7 ~~would~~ **may** not have been developed otherwise while at the same time providing more capacity
8 at time of system peak per dollar spent under the CSI initiative than traditional flat panel rooftop
9 solar installations.

10 Traditional solar installations throughout San Diego, and the rest of California, mainly
11 consist of rooftop installations. These types of installations employ fixed panels that produce
12 energy throughout the day. However, their MW output at the time of the SDG&E system peak is
13 significantly reduced. Of great significance to SDG&E's customers, the SDG&E Solar Energy
14 Project is designed in such a way as to increase the energy output throughout the day and
15 increase the MW output at the time of the SDG&E system peak by as much as 65%. This is
16 accomplished by orienting the array via a tracking mechanism to maximize the solar incidence
17 angle and the resultant solar radiation absorbed by the panels, as is explained in more detail in
18 Mr. Thomas Bialek's testimony in Chapter II.

19 The SDG&E Solar Energy Project will also further diversify SDG&E's energy resource
20 portfolio. The SDG&E Solar Energy Project supports SDG&E's Long Term Procurement Plan,
21 as it will provide diversification of generation in terms of technology, delivery location, and
22 ownership. The SDG&E Solar Energy Project will also help SDG&E achieve its RPS goals by
23 creating the opportunity for solar to become the largest commercially available renewable
24 resource in SDG&E's load basin.

25 Even with the abundance of solar resource potential, there are limited opportunities to
26 develop renewable resources within SDG&E's service territory. As a result, there will still not
27 be enough in-basin solar generation opportunities to satisfy all SDG&E's RPS requirements.¹⁰ In

28 ¹⁰ 52 MW_{dc} equates to roughly ~~0.37%~~ **0.38%** of SDG&E's ~~2013~~ **2012** retail electric sales.

1 order to meet its RPS requirements and goals, SDG&E will still need to rely upon large scale
2 renewable energy projects that will be required to be delivered through the transmission system.

3 **IV. THE SDG&E SOLAR ENERGY PROJECT COMPLEMENTS CSI AND RPS**

4 Importantly, the SDG&E Solar Energy Project does not duplicate or conflict with
5 California's existing CSI or RPS RFO programs, but rather augments and complements both,
6 plus, it facilitates the development of new resources under the CSI that ~~would~~ **may** not have
7 been developed otherwise.

8 The SDG&E Solar Energy Project does not pursue large central station PV generating
9 facilities that are connected to the transmission system which may be more appropriately bid into
10 an RPS RFO. Rather, the SDG&E Solar Energy Project will focus on the unexploited
11 commercial solar generation market between 1 and 2 MW_{ac} that is not currently being served by
12 CSI programs which will be connected to the distribution system.

13 The SDG&E Solar Energy Project will also provide host customers who wish to take
14 advantage of the solar project development on their sites the opportunity to co-develop their own
15 solar projects through the State's CSI program along with SDG&E's development of SDG&E
16 Solar Energy Project installations. By building the two projects simultaneously, both SDG&E
17 and the host customer can take advantage of the economies of scale to capture the benefits of an
18 overall lower development cost. This co-development can either be provided by the customer, or
19 by the third parties in the market who, in turn, can lease the co-development or sell the energy
20 produced there from directly to the customer to the extent permitted by law.

21 This opportunity for customers to co-develop solar PV facilities with SDG&E through
22 the SDG&E Solar Energy Project is significant. Within the past year, SDG&E observed a
23 marked decline in customer participation in the CSI program, likely due in large part to the
24 current state of the economy, including escalating gas prices, increasing foreclosures, and the
25 credit crunch, all of which have left fewer customers with expendable funds for participation in
26 even subsidized solar programs. This has resulted in a 30% decrease in CSI applications in San
27 Diego since the beginning of 2007.

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1 The SDG&E Solar Energy Project is intended to ameliorate this trend away from
2 building solar installations and to encourage greater deployment of solar systems, thereby
3 providing a way to continue the development of solar photovoltaic power while the economy
4 recovers.

5 **V. THE SDG&E SOLAR ENERGY PROJECT FURTHERS THE STATE’S**
6 **PROGRESS TOWARD THE GOALS OF AB 32**

7 In addition to promoting the State’s goals of increasing dependence upon renewable
8 energy in general, and solar energy in particular, the SDG&E Solar Energy Project furthers the
9 State’s progress toward AB 32 goals.

10 52 MW_{dc} of new solar capacity that would offset fossil-fired generation has the potential
11 to reduce annual GHG emissions by up to 34,480 metric tons.

12 **VI. THE SDG&E SOLAR ENERGY PROJECT BUILDS ON SDG&E’S SOLAR PV**
13 **EXPERIENCE**

14 Through its Sustainable Communities Program (“SCP”), a multi-faceted program
15 combining the promotion of “green” building design, sustainability and high energy efficiency,
16 SDG&E has gained five valuable years of experience in the planning, installing, owning and
17 maintaining of clean energy systems on customer sites. SCP provides SDG&E with the broad
18 experience to implement the SDG&E Solar Energy Project and accelerate the project
19 implementation schedule.

20 As SCP was the first utility program of its kind in the nation, it was necessary for
21 SDG&E to design and implement all aspects of the Clean Energy Systems component, striving
22 for best practices to maximize implementation efficiency, PV system production and cost
23 effectiveness.

24 SDG&E’s SCP experience demonstrates the advisability of securing competitive bids for
25 project implementation, and SDG&E will continue to competitively bid all projects pursuant to
26 standard utility practices.

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1 **VII. SUMMARY AND CONCLUSION**

2 It is clear that State policy requires SDG&E’s delivery of energy to its customers in the
3 future to include an expanded use of renewable energy resources. The SDG&E Solar Energy
4 Project recognizes the tremendous potential within California to generate electricity from the
5 sun. Solar electric generating facilities will contribute to SDG&E’s renewable energy portfolio
6 and overall resource portfolio. The SDG&E Solar Energy Project supports the State’s goals of
7 increasing renewable resources and, specifically, solar energy resources and of reducing GHG
8 emissions. Accordingly, the SDG&E Solar Energy Project should be approved as filed without
9 delay.

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1 **VIII. WITNESS QUALIFICATIONS**

2 My name is James P. Avery. My business address is 8330 Century Park Court, San
3 Diego, California, 92123. In my current position as Senior Vice President – Electric for
4 SDG&E, I oversee the company’s generation, transmission and distribution business units.

5 I attended Manhattan College, New York City, New York, graduating with a Bachelor of
6 Engineering Degree in Electrical Engineering with a major field of study in Electric Power.
7 Prior to that, I attained an Associates Degree in the field of Electrical Engineering from New
8 York City Community College.

9 Prior to joining SDG&E in 2001, I was a consultant with R.J. Rudden Associates, one of
10 the nation’s leading management and economic consulting firms specializing in energy and
11 utility matters. Prior to that, I functioned as the chief executive officer of the electric and gas
12 operations at Citizens Utilities Company, a multi-service organization that provided electric, gas,
13 telecom, water and wastewater services in over 20 states across the nation.

14 I am currently on the Board of Directors of the California Power Exchange, and also
15 served as a member of the Board of Directors of R.J. Rudden Associates, and of Vermont
16 Electric Power Company, a transmission-only company serving the state of Vermont, and have
17 held positions at American Electric Power Service Corporation.

18 I have previously testified before this Commission.
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