Company: San Diego Gas & Electric Company (U 902 M)
Proceeding: 2016 General Rate Case
Application: A.14-11-___
Exhibit: SDG&E-19

SDG&E

DIRECT TESTIMONY OF STEPHEN J. MIKOVITS

(INFORMATION TECHNOLOGY)

November 2014

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

SDGE
A Sempra Energy utility®

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SUMMARY FOR SAN DIEGO GAS & ELECTRIC INFORMATION TECHNOLOGY

O&M	2013 ($000)	2016 ($000)	Change ($000)
Non-Shared	14,445	18,702	4,257
Shared	76,102	91,046	14,944
Total	**90,547**	**109,748**	**19,201**

Capital	2014 ($000)	2015 ($000)	2016 ($000)
IT	49,723	26,103	15,163
Business	44,551	35,981	20,225
Total	**94,274**	**62,084**	**35,388**

Summary of Requests from SDG&E IT

- Provide support services that directly contribute to San Diego Gas & Electric's ("SDG&E's") ability to provide secure, safe and reliable service at reasonable rates for our customers while maintaining a safe work environment for our employees
- Enhance and strengthen cybersecurity to ensure that ever-present security threats do not disrupt business operations and secure customer data to meet growing privacy regulations
- Position the Information Technology ("IT") Division ("IT Division", or alternatively, "IT") to meet the continued growth in business demand
- Address aging, end-of-life infrastructure, as well as provide upgrades in the information security area through capital expenditures for IT

SDG&E DIRECT TESTIMONY OF STEPHEN J. MIKOVITS
INFORMATION TECHNOLOGY (IT)

I. INTRODUCTION

A. Summary of Total IT Division Costs

The IT Division is responsible for a majority of traditional technology-related services and activities, including cybersecurity, for SDG&E, Southern California Gas Company ("SoCalGas"), and Sempra Energy Corporate Center ("Corporate Center"). These services include supporting applications, hardware and software, some of which are used for risk assessment and management across the company. Our business clients rely on IT to provide technology support for numerous areas help them deliver safe and reliable service to our customers. The areas include, but are not limited to, asset management, work management and measurement, electric and fuel procurement, outage management, distribution system management, financial management, accounting, customer field operations, meter reading, customer energy management, smart meter data management, routing, scheduling, dispatching work orders to field personnel, revenue cycle processing, customer assistance and customer contact functions. This is accomplished through the IT Division's operation of company data centers that store and manage data, including those used for risk assessments and development of related mitigation plans, as well as foundational information security services to ensure security and privacy. The costs for the IT services and activities that are attributed to cost centers at SDG&E are included in my testimony. The costs for the IT services and activities attributed to cost centers at SoCalGas are sponsored by SoCalGas Information Technology witness Christopher Olmsted (Ex. SCG-18).

Table SJM-1 below summarizes the overall costs for services and capital investments provided by the IT Division.

TABLE SJM-1

Test Year 2016 Summary of IT Division (SDG&E and SoCalGas) Total Costs

IT - INFORMATION TECHNOLOGY			
Shown in Thousands of 2013 Dollars	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
SoCalGas	18,936	23,624	4,688
SDG&E	90,547	109,748	19,201
Total O&M	**109,483**	**133,372**	**23,889**

	2014	**2015**	**2016**
SoCalGas	104,397	119,915	104.795
SDG&E	94,274	62,084	35,388
Total Capital	**198,671**	**181,999**	**140,183**

B. Forecast Methodology

The forecast methodology developed for IT costs is the base year (2013) recorded, plus adjustments. The adjustments are detailed in my Operations & Maintenance ("O&M") workpapers, Exhibit SDG&E-19-WP.

Using this methodology is most appropriate for numerous reasons. First, the pace of change in the technology industry continues to accelerate when compared to prior years. This is evidenced by growth in computing power at the hardware level as well as the number and diversity of applications at the software level. Factoring in emerging computing trends, such as cloud computing and the increasing commercialization of IT capabilities, directed us to use current data and adjustments rather than relying on historical averages that do not include these types of trends in our computing environment. Second, the rapidly changing security threat landscape drives our current cybersecurity risk management activities. These risks and our subsequent risk management activities did not necessarily previously exist in their current form, so they would not be fully accounted for in a historical average. Third, the evolving regulatory requirements around customer data privacy are not fully reflected in a historical average. Fourth, the level of support provided by the IT Division continues to grow as capital projects are implemented since projects that drive benefits and efficiencies within business units often create increased workload within the IT Division that would not have been reflected in our historical costs. As an example, SDG&E has implemented a number of projects to enhance its customer interaction channels that increase customer self-service, allow customers to manage their energy use, and allow customers to enroll in new pricing plans. These projects have helped meet

evolving customer interaction and service preferences and also contributed to increased self-service as described in the testimony of Brad Baugh (Ex. SDG&E-14). However, these enhancements have also resulted in additional functions and features that IT must support.

Using the base year, plus adjustments, methodology starts the IT Division at a lower requested dollar amount than if we had utilized 3-year, 4-year or 5-year averages (see Table SJM-2). Use of the base year, plus adjustments, methodology is consistent with SoCalGas' approach, as demonstrated in the testimony of SoCalGas IT witness Chris Olmsted (Ex. SCG-18).

TABLE SJM-2

IT Division (SDG&E and SoCalGas) Forecast Methodology Comparison (000's)[1]

2013 Adjusted-Recorded	5-Year Average	4-Year Average	3-Year Average
109,483	111,741	111,578	111,192

C. Summary of SDG&E IT Costs

The costs presented in the remainder of my testimony are specific to IT costs charged to SDG&E cost centers. I am sponsoring the Test Year ("TY") 2016 forecasts for O&M costs for both non-shared and shared services, and capital costs for the forecast years 2014, 2015, and 2016. Table SJM-3 summarizes my SDG&E IT-sponsored costs.

TABLE SJM-3

SDG&E

Test Year 2016 Summary of SDG&E IT Costs

IT - INFORMATION TECHNOLOGY			
Shown in Thousands of 2013 Dollars	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
Total Non-Shared	14,445	18,702	4,257
Total Shared Services (Incurred)	76,102	91,046	14,944
Total O&M	**90,547**	**109,748**	**19,201**

	2014	**2015**	**2016**
Total Capital	**94,274**	**62,084**	**35,388**

[1] The average historical costs in this table include both routine IT support as well as unique project work that may vary from year to year. All costs have been included within our historical averages and accurately reflect the scope of IT Division responsibilities.

Some of the costs shown in Table SJM-3 serve only SDG&E, but in most cases, the costs are "shared" and thus serve SDG&E as well as SoCalGas and Corporate Center. Section II discusses non-shared costs that are incurred and activities performed solely for the benefit of SDG&E. Section III discusses shared costs and activities that benefit SDG&E, SoCalGas and/or Corporate Center. Section IV discusses SDG&E IT capital costs.

D. Summary of Activities

The IT Division is responsible for a variety of technology-related services and activities for SDG&E, SoCalGas and Corporate Center. The costs presented in my testimony have been categorized into four areas:

- Applications – IT Applications support the development, implementation and maintenance of computer software utilized by customers, employees and/or vendor partners.
- Information Security – Information Security supports governance and compliance functions, corporate security policy framework, security risk management and exception tracking, project roadmap and portfolio management, and the fulfillment of statutory and regulatory requirements.
- Infrastructure – IT Infrastructure supports the design, implementation and operation of the company's computing infrastructure, and includes both hardware (ranging from desktop computing systems and servers to storage systems) and software (including middleware, production control, operating systems, and other low-level software systems).
- IT Support - this category of costs includes labor and non-labor for cost centers that are not specifically aligned with the other three IT areas described above.

E. IT's Support of SDG&E's Goals and Related Initiatives

As an organization that is pervasive across the company, the IT Division is involved in many of the goals and related initiatives of SDG&E and SoCalGas. I have briefly discussed the key areas where IT plays a significant role, specifically Cybersecurity and Risk Management, Customer Service Enhancement and Customer Privacy, New Technology, and Operational Efficiencies. These areas of focus are identical for SDG&E and SoCalGas.

1. Cybersecurity and Risk Management

Cybersecurity in the utility business has become a significant source of attention and interest in the recent years. Publically disclosed attacks on customer information and critical infrastructure have been the focus of many discussions and proposed legislation in Sacramento and in Washington DC. Recent events such as the Target breach[2] and the successful attack on the critical infrastructure at an unnamed utility[3] highlight an ever increasing adversarial focus on our industry.

Illustrative examples of the types of cybersecurity risks facing the Sempra Energy Utilities ("SEu") include:

- Loss of industrial control systems, such as Supervisory Control and Data Acquisition ("SCADA");
- Malware on company computer systems;
- Release or corruption of customer information (especially Personally Identifiable Information); and
- Loss of data and/or data center computing equipment due to natural or man-made disasters.

IT operates the Information Security Program, which is designed to manage a variety of cybersecurity-related risks. The Information Security Program provides cybersecurity services to SDG&E, SoCalGas and Corporate Center and consists of both Non-Shared and Shared costs, which are discussed in Sections II.D and III.D, respectively. The Information Security Program is structured into four basic areas designed to provide a holistic approach:

- Governance and Compliance - The Governance and Compliance functions of the Information Security Program provide security program strategy and oversight; a corporate security policy framework consisting of policies, standards, and guidelines; security risk management and exception tracking; project roadmap and portfolio management; security legislation and regulatory analysis; as well as

[2] Target, a message from CEO Gregg Steinhafel about Target's payment card issues, December 20, 2013, available at https://corporate.target.com/discover/article/Important-Notice-Unauthorized-access-to-payment-ca (last accessed July 17, 2014).

[3] Jim Finkle, U.S. utility's control system was hacked, says Homeland Security, Reuters, May 20, 2014, available at ICS-CERT Utility Breach Report: http://www.reuters.com/article/2014/05/21/us-usa-cybercrime-infrastructure-idUSBREA4J10D20140521 (last accessed July 17, 2014).

IT compliance associated with Sarbanes-Oxley Act Section 404 ("SOX") and North American Electric Reliability Corporation Critical Infrastructure Protection ("NERC CIP") regulations.

- Awareness and Outreach - The Information Security Program's focus on awareness and outreach is designed to provide security-oriented training and communication to all company employees through the use of newsletters, flyers, digital publications, town hall meetings, classroom and online training, and special events with cybersecurity experts.
- Security Engineering - The Security Engineering practice was established within the Information Security Program to provide security architecture, establish security controls (which are combinations of people, process, and/or technology elements that are designed to protect systems and data from harm), support the security operation capability, and consult with the business units on initiatives implementing new technology and business systems to evaluate any risks these new technologies or business systems may pose and the controls necessary to mitigate those potential risks.
- Security Operations - Security Operations is a dynamic and fast paced function within the Information Security Program. Security Operations focuses on the technical management of security infrastructure, such as firewalls and intrusion prevention systems, maintains process and procedure documentation, performs digital forensics and threat response, conducts vulnerability assessment and penetration testing, assesses threat intelligence information, operates enterprise access controls, performs around-the-clock security monitoring and analysis, and collaborates with government agencies and law enforcement partners on cybersecurity threat intelligence.

The Information Security Program relies on industry practices and is structured to reflect recognized security control frameworks, such as the National Institute of Standards and

Technology ("NIST") 800-53 Rev. 4[4] and the SANS Institute control framework titled "The Critical Security Controls for Effective Cyber Defense" Ver. 5.[5] These two control frameworks are complimentary and enable SEu to leverage defined security frameworks to protect business systems and critical infrastructure while simultaneously maintaining regulatory compliance objectives, such as those covered under the SOX regulations and the NERC CIP reliability standards.

i. Risk Management

The IT Division, and more specifically the Information Security Program, applies risk management practices and processes to protect systems and data. Specifically, the Information Security Program aligns with the enterprise risk management ("ERM") governance process at SDG&E referenced in the testimony of SDG&E Risk Management and Policy witness Diana L. Day (Ex. SDG&E-02) to manage cybersecurity-related risks.

As described below, IT has tailored the SDG&E ERM governance process to meet the unique and complex challenges associated with managing cybersecurity-related risks in a shared services organization.

ii. Risk Management Framework

SEu's cybersecurity risk management framework is a straight-forward method of assessment that uses ERM constructs, such as "likelihood," "severity" and "impact categories." In essence, a cybersecurity risk assessment is based on several ERM factors including, but not limited to, strength of controls, likelihood (or frequency) of a risk event occurring, and severity (or impact) of the business consequence if the risk event occurs. These factors are assessed using a qualitative 1 to 5 scale against broad ERM categories of Financial, Operational, Safety and Reputational impacts. The collection of defined cybersecurity controls (i.e., the control framework) is considered when attempting to determine Key Risk Indicators[6] and their application to the appropriate company (e.g., SDG&E and/or SoCalGas).

As emphasized in the testimony of Ms. Day (Ex. SDG&E-02), the SDG&E ERM process strives to ensure that risk management decisions are an integral part of key organizational

[4] National Institute of Standards and Technology and U.S. Department of Commerce, Security and Privacy Controls for Federal Information Systems and Organizations: JOINT TASK FORCE TRANSFORMATION INITIATIVE (NIST 800-53 Rev 4), April 2013, available at http://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-53r4.pdf (last accessed July 3, 2014).
[5] Council on Cybersecurity, The Critical Security Controls for Effective Cyber Defense version 5, available at https://www.sans.org/media/critical-security-controls/CSC-5.pdf (last accessed July 3, 2014).
[6] Key Risk Indicators are discussed in greater detail below in Section I.E.1.iii of my testimony.

decision-making processes. The IT Division's goal is to do the same. For example, the IT Division elevates the first of two types of risk - enterprise risks – to IT management for decision making. Illustrative examples of enterprise risks include potential technology failures due to:

- data center environment disruptions
- destruction of computing infrastructure
- disruptions to automated system integration processes
- theft of computing infrastructure

The second type of risk - individual risks – are smaller in size, scope and/or potential costs to mitigate than enterprise risks. Individual risks are those which typically involve only one system or a single attack method as opposed to an enterprise risk which would result in a complete security control failure across the corporation. The IT Division evaluates individual risks the same way as enterprise risks, notably they are assessed based on a combination of factors such as the nature of the vulnerability, the likelihood (or frequency) of the vulnerability being exploited and the business consequence (or impact) if exploitation actually occurs.

Risk mitigation generally involves the implementation of new technology, a new process, and/or the addition of workforce labor. Alternative risk treatments are considered by Information Security as part of the evaluation process to determine how effective a control will be in mitigating a particular risk. Information Security works with the risk owner to develop mitigation plans tailored to the particular type of risk being faced. For example, generally, individual risks can be managed by making modifications to existing enterprise security controls.

On the other hand, enterprise risks demand additional effort to mitigate because of their larger size, scope and/or potential cost. For example, in some cases of an enterprise risk, such as when new security technical controls are being considered, alternative treatments are considered through a typical Request For Proposal ("RFP") process in order to obtain information from potential security solution vendors about the availability, cost, implementation and ongoing support requirements associated with a particular security product and/or service. The RFP process helps Information Security select a product or service that presents an effective approach for reducing the enterprise risk under consideration. For proposed enterprise risk treatments that follow the business case process, the mitigation plans are incorporated into the materials used to present IT management with a project concept document for approval. These proposed project

concept documents are evaluated against both security and business factors to determine whether or not they will be approved. If a proposed project concept is approved, it enters the business case development phase, which is described below in Section IV.B.4 of my testimony. A project concept document template is provided attached hereto at Appendix A and a sample business case template is provided in my supplemental workpapers at Exhibit SDG&E-19-SWP.

In some cases, this process also results in the identification of a control gap.[7] Where control gaps are identified, either related to a single application, system, project, or the SEu enterprise, a determination is made of the risk rating that the control gap itself presents.

Once a risk or a control gap is identified, it is addressed by remediation, compensating controls, and/or risk acceptance. Risk acceptance decisions are tracked and reported to IT management on a quarterly basis. This tracking process was initiated in 2014. On an independent basis, the internal audit function also tracks and reports risks to the Sempra Energy Audit Committee.

iii. Key Risk Indicators

The Information Security Program tracks cybersecurity risk using Key Risk Indicators ("KRI"s). KRIs are meant to provide the earliest warning that a risk is exceeding a predetermined threshold and may result in catastrophic consequences. KRIs are used to measure where specific cybersecurity risks may be present and provide management with the information necessary to implement compensating controls, take remediation actions, or accept risk. KRIs used by the Information Security Program have several common characteristics, namely they are quantifiable, serve as leading indicators, and provide consistent methods of measurement.

The Information Security Program primarily focuses on indicators that would provide the earliest warning that a risk is exceeding a predetermined threshold and could result in catastrophic consequences. One example of a KRI is the number of cybersecurity events reviewed and analyzed as compared to those that are not able to be reviewed or analyzed. Another example of a relevant cybersecurity KRI is the number and severity of security events per month (i.e., suspicious activities), such as a system outage or performance problem, that indicates a potential security breach could or has occurred. The number of critical security vulnerabilities not remediated within a set time frame is also a KRI. KRIs help provide a clear

[7] A control gap is a deficiency or weakness in a security control that could result in a security incident. A simple example would be a manual process or procedure that should be followed by all personnel, but is found to only be followed by some personnel.

picture of where problems might exist and enable management to prioritize and initiate actions to lower the risk profile.

iv. Monitoring Threats and Mitigation Plans

Cybersecurity threat reports are most often derived from a combination of public and confidential sources. Cyber threats, by their nature, move quickly and more often than not, they are discovered only after a security breach has occurred. Monitoring for threats presents many challenges and heavily relies on personnel who have specialized training, demonstrated expertise, and industry specific knowledge in cyber threat analysis. Once new threats are discovered, the focus immediately moves to establishing an adequate understanding of the threat, namely what it consist of and how it works. As soon as those aspects are understood, an evaluation can be made by the Information Security team to determine the risk to the company, and effective mitigation plans can be devised and implemented.

For each identified risk, specific mitigation plans are developed. These plans can vary in complexity and duration. For example, a business case may need to be initiated for implementing a new technical security control or routine maintenance may need to be performed in order to patch a vulnerable system. For both types of mitigation plans, the risks are tracked through a risk exception process that requires multiple levels of management approval.

2. Customer Privacy and Customer Service Initiatives

Focus on customers, including the privacy of their data, is a key priority for SDG&E and the IT Division needs to be funded and staffed to help meet this goal. There is increased demand to add and enhance services for our customers while keeping their information secure, especially personally identifiable information. IT supports these new and enhanced services and customer privacy efforts. Discussions of specific initiatives are described in the testimony of SDG&E Customer Service Operations, Information, and Technologies witness Bradley Baugh (Ex. SDG&E-14).

3. New Technology

The IT Division is constantly challenged by the pace of change in technology. We continuously assess these changes and their impact on prior investment decisions. Our goal is to exercise past technology investment decisions in IT assets as approved in prior General Rate Cases ("GRCs") through (and beyond) their useful life while simultaneously integrating new technologies into the asset mix. Part of the challenge we currently face is the financial treatment

of these new technologies. In particular, many new technologies are treated as O&M, rather than capital costs.

For example, we foresee cloud computing as a cost effective option to meet some of our computing requirements. As such, we have factored in cloud computing into our IT revenue request (Ex. SDG&E-19-WP, Category C. Information Security, Cost Center 2100-3774.000). However, the financial treatment of cloud technologies as an O&M cost typically creates additional upward pressure on annual operating costs because cloud technologies are generally not treated as assets (e.g., capital investments) within the utility industry. IT has been a good steward of its assigned funding levels, as demonstrated by 2013 costs when compared to historical averages (see Table SJM-2). We will continue to do so as we refresh our computing assets.

4. Operating Efficiencies

Seeking out ways to improve processes and increase productivity is an on-going effort within the IT Division. Examples of typical efficiency initiatives include workflow optimizations, reorganizations to consolidate management responsibilities, cross-training of technical staff, aggressive re-negotiation of external vendor licenses and maintenance contracts, and reductions in reimbursable employee expenses. These types of initiatives helped reduce operating costs in 2013 and are reflected in the base year costs for IT. I have noted material efficiencies in my testimony, when possible.

II. NON-SHARED COSTS

A. Introduction

Table SJM-4 summarizes the total non-shared O&M forecasts for the listed cost categories. These costs are related to activities that are performed solely for the benefit of SDG&E and are charged to SDG&E cost centers.

TABLE SJM-4

SDG&E

Non-Shared O&M Summary of Costs

IT - INFORMATION TECHNOLOGY			
Shown in Thousands of 2013 Dollars			
Categories of Management	2013 Adjusted-Recorded	TY2016 Estimated	Change
A. Applications	12,993	17,667	4,674
B. Infrastructure	224	224	0
C. Information Security	159	159	0
D. IT Support	1,069	652	-417
Total	14,445	18,702	4,257

B. IT Applications (Non-Shared)

1. Description of Costs and Underlying Activities

The Non-Shared SDG&E IT Applications costs represent labor and non-labor for systems where 100% of the activities directly support SDG&E. The types of systems supported in this area include customer field operations, work order management, smart meter data management, customer billing, service order routing, scheduling and dispatching, revenue cycle processing, and customer assistance and customer contact functions, including self-service capabilities via MyAccount. For example, the Service Order Routing Technology ("SORT") system, an IT application, is a work order management system used only by SDG&E customer service field personnel. The SORT system schedules, routes and dispatches work to SDG&E field personnel. The SORT system collects specifics on work performed at a customer's premise, which is recorded and returned to other SDG&E systems for status and reporting. Providing the right information in a timely manner helps ensure that SDG&E field employees are able to perform their duties and provide customer services in a safe and timely manner.

Table SJM-5 summarizes the total Non-Shared SDG&E O&M IT Applications forecast.

TABLE SJM-5

SDG&E

Non-Shared O&M IT Applications Costs

IT - INFORMATION TECHNOLOGY			
Shown in Thousands of 2013 Dollars			
A. Applications	2013 Adjusted-Recorded	TY2016 Estimated	Change
1. Applications	12,993	17,667	4,674
Total	12,993	17,667	4,674

2. Cost Drivers

The primary factor driving the increased SDG&E IT Applications costs is CISCO, our internal customer information and billing system. Due to ongoing industry and regulatory changes (e.g., the integration of renewable energy sources with our electric distribution system and the shift to real-time pricing), the business demand for IT services continues to grow. New technology functions and features are being requested by various business groups to meet safety, reliability and customer expectations. The IT application, CISCO, is at the center of many of these changes. Originally implemented in May 1998, CISCO has been constantly enhanced over the past 16 years to meet changing business requirements during that period of time and is approaching a point in time where it will need to be either significantly overhauled or replaced. The initial strategy work that needs to be done in order to make that decision will require a combination of labor and non-labor resources. More specifically, the forecast for this effort is $2,000k.

The remainder of the cost increases being requested for Non-Shared SDG&E IT Applications are associated with SDG&E application software contracts coming off warranty or with escalation terms ($827k). In general, application software contracts are initiated during the initial implementation of the business system, which typically occurs as part of a capital project, and frequently includes a warranty period ranging from 1 to 5 years. These warranty costs are often funded as part of the approved capital project. However, at the end of the warranty period, the annual cost for these software contracts needs to be funded as incremental O&M costs. The other factor contributing to the increase in application software contract expenditures involves escalation terms that were negotiated into the contract. Escalation factors typically vary according to the type and length of contract. In addition, I am requesting increased costs to support 12.7 additional Full Time Equivalents ("FTE") labor resources needed to support enhanced business systems, such as the Customer Energy Network ("CEN"), Customer Relationship Management ("CRM"), Smart Pricing Program ("SPP"), Construction Planning & Design ("CPD") and PowerWorks systems ($1,747k) (see Ex. SDG&E-19-WP-, 1IT001.000).

C. IT Infrastructure (Non-Shared)

1. Description of Costs and Underlying Activities

These Non-Shared SDG&E IT Infrastructure costs represent labor and non-labor for the infrastructure area where 100% of the activities are for SDG&E. These costs are typically

related to providing service to SDG&E-only facilities (e.g., construction and operations districts, and customer contact centers) and include network engineering infrastructure support. Table SJM-6 summarizes the total non-shared O&M Infrastructure forecast.

TABLE SJM-6

SDG&E

Non-Shared O&M IT Infrastructure Costs

IT - INFORMATION TECHNOLOGY			
Shown in Thousands of 2013 Dollars			
B. Infrastructure	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. Infrastructure	224	224	0
Total	**224**	**224**	**0**

2. Cost Drivers

It is expected that the recorded 2013 Non-Shared SDG&E IT infrastructure expenditures will continue through TY2016. This will allow IT to continue to support network connectivity at SDG&E-only facilities as it has in past years.

D. Information Security (Non-Shared)

1. Description of Costs and Underlying Activities

The costs in Non-Shared SDG&E Information Security consist of labor and non-labor IT regulatory compliance activities that are specific to SDG&E. Table SJM-7 summarizes the total Non-Shared SDG&E O&M Information Security forecast.

TABLE SJM-7

SDG&E

Non-Shared O&M Information Security Costs

IT - INFORMATION TECHNOLOGY			
Shown in Thousands of 2013 Dollars			
C. Information Security	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. Information Security	159	159	0
Total	**159**	**159**	**0**

2. Cost Drivers

The costs in Non-Shared SDG&E Information Security consist of labor and non-labor IT regulatory compliance activities that are specific to SDG&E. It is expected that the recorded 2013 non-shared Information Security expenditures will continue through TY2016.

Note that the majority of Information Security costs are shared, and therefore are discussed below in Section III.D of my testimony or, for those shared Information Security costs located in SoCalGas cost centers, in the testimony of SoCalGas IT witness Christopher Olmsted (Ex. SCG-18).

E. IT Support (Non-Shared)

1. Description of Costs and Underlying Activities

The costs in Non-Shared SDG&E IT Support area cover labor and non-labor expenditures for the SDG&E business optimization program. The business optimization program consists of a focused set of resources equipped to assist various divisions within the company in the identification and implementation of operating efficiencies. Table SJM-8 summarizes the total Non-Shared O&M IT Support forecast for SDG&E.

TABLE SJM-8

SDG&E

Non-Shared O&M IT Support

Shown in Thousands of 2013 Dollars			
D. IT Support	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. IT Support	**1,069**	**652**	**-417**
Total	**1,069**	**652**	**-417**

2. Cost Drivers

The SDG&E business optimization program costs are forecasted to decrease by TY2016 because the use of third party consultants is expected to decline, thus we are only requesting dollar amounts to support the full year salary for two employees and the non-labor related costs needed to support them.

III. SHARED COSTS

A. Introduction

The IT Division is a shared services organization that provides system-wide services for SDG&E, SoCalGas, and Corporate Center. Most of the IT cost centers assigned to SDG&E share a portion of their costs with SoCalGas and/or Corporate ("shared services"). As a result, the bulk of the cost increases I am requesting on behalf of SDG&E IT are found in this section of my testimony. I am sponsoring the forecasts on a total-incurred basis, as well as the shared services allocation percentages related to those costs. The allocation percentages are determined by cost center owners based upon appropriate metrics (e.g., number of users, amount of storage,

number of servers) to distribute costs across companies. Those percentages are presented in my shared services workpapers, along with a description explaining the activities being allocated (Ex. SDG&E-19-WP). The dollar amounts allocated to affiliates are presented in the testimony of SDG&E Shared Services and Shared Assets Billing Policies and Process witness, Mark Diancin (Ex. SDG&E-26). Table SJM-9 summarizes the total shared O&M forecasts.

TABLE SJM-9

SDG&E

Shared O&M Summary of Costs

IT - INFORMATION TECHNOLOGY			
Shown in Thousands of 2013 Dollars Incurred Costs (100% Level)			
Categories of Management	2013 Adjusted-Recorded	TY2016 Estimated	Change
A. Applications	18,591	25,042	6,451
B. Infrastructure	48,614	55,048	6,434
C. Information Security	3,589	5,613	2,024
D. IT Support	5,308	5,343	35
Total Shared Services (Incurred)	76,102	91,046	14,944

B. IT Applications (Shared)

1. Description of Costs and Underlying Activities

The Shared IT Applications costs represent labor and non-labor for systems where activities performed are not solely dedicated to SDG&E but the costs reside in SDG&E cost centers. Most IT Applications supported by SDG&E IT are shared and the cost sharing approach is based on a "Causal-Beneficial" allocation method. Shared service cost allocation methods are addressed by witness Mark Diancin (Ex. SDG&E-26). The types of systems supported in this area include asset management, distribution work management, procurement, supply chain and financial systems. In general, this diverse portfolio of existing IT applications require frequent investments to satisfy the changing requirements of our business users who rely on these systems to perform their daily tasks. For example, Systems Applications and Products ("SAP") is an application that is used across the Sempra Energy organization. SDG&E payrolled employees that provide support for SAP have their time allocated to SDG&E, SoCalGas and Corporate Center based on the number of users of the SAP system for each company.

Table SJM-10 summarizes the total shared O&M Application forecast.

TABLE SJM-10

SDG&E

Shared O&M IT Application Costs

IT - INFORMATION TECHNOLOGY			
Shown in Thousands of 2013 Dollars Incurred Costs (100% Level)			
A. Applications	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. Applications	18,591	25,042	6,451
Incurred Costs Total	**18,591**	**25,042**	**6,451**

2. Cost Drivers

Business demand for IT services continues to grow. New technology functions and features are being requested by business units to meet safety, reliability and customer privacy initiatives. The IT Application portfolio continues to grow as a result of capital project implementations. This is in addition to the already diverse portfolio of IT Applications in place that require investments to manage the daily, ongoing requirements of our business users who rely on these systems to perform their daily tasks. The cost increase presented for Shared IT Applications charged to SDG&E cost centers includes additional labor resources to meet increased demand for ongoing support along with additional non-labor for software maintenance contracts. The most significant amount of this increase is associated with Geographic Information System ("GIS") system software and maintenance costs. These costs are estimated to be $2,314k in TY2016 due to the 5 year warranty period ending in 2015. In addition, incremental costs associated with the remaining software license and maintenance contracts across the application portfolio are estimated to be $1,824k in TY2016. The remainder of the increase I am requesting for Shared IT Applications is for 12 FTEs needed to support new business applications.

C. IT Infrastructure (Shared)

1. Description of Costs and Underlying Activities

The Shared IT infrastructure costs charged to SDG&E cost centers represent labor and non-labor for infrastructure activities performed to benefit SDG&E, SoCalGas and Corporate Center. Examples of these activities include operating the data centers around the clock (e.g., servers, storage, routers), integrating with cloud service providers, manning the enterprise

command center that monitors IT systems and services, supporting the phone system and operating the IT help desk. Services include, but are not limited to, providing support for the design, deployment and support of hardware and software systems relating to distributed (i.e., UNIX and Windows) and enterprise (i.e., IBM Z/OS) class servers, disaster recovery, production management, data storage systems, service and help desk management, web-based applications middleware, and services infrastructure.

Table SJM-11 summarizes the total Shared O&M IT Infrastructure forecast for costs in SDG&E cost centers. Although the vast majority of Shared IT infrastructure total costs are captured in SDG&E cost centers, there are also some Shared IT infrastructure costs captured in SoCalGas cost centers, as described in the testimony of SoCalGas IT witness Christopher Olmsted (Ex. SCG-18).

TABLE SJM-11

SDG&E

Shared O&M IT Infrastructure Costs

IT - INFORMATION TECHNOLOGY			
Shown in Thousands of 2013 Dollars Incurred Costs (100% Level)			
B. Infrastructure	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. Infrastructure	48,614	55,048[8]	6,434
Incurred Costs Total	**48,614**	**55,048**	**6,434**

2. Cost Drivers

As the IT Applications portfolio grows, so does the amount of support needed at the IT Infrastructure level. The increase presented for IT Infrastructure costs allocated to SDG&E cost centers includes additional labor resources to meet increased demand for ongoing support, as well as additional non-labor for hardware maintenance contracts. Over half of the requested increase, $3,818k, is associated with hardware maintenance contracts for equipment coming off warranty or escalation factors that were negotiated as part of the current vendor agreements. It is important to note that the $3,818k increase is materially lower by $4,544k than it otherwise would have been if not for the operational efficiency efforts of the IT Division to aggressively re-

[8] SDG&E's request for Shared IT O&M Infrastructure Costs includes costs for supporting our mainframe environment. At the time of the Application filing, SDG&E is analyzing outsourcing this service to a third party. If this occurs, SDG&E will update the record as appropriate.

negotiate external vendor licenses and maintenance contracts. An additional $420k is needed for specific ongoing network costs, such as performing network maintenance activities, as well as the development of a strategy to leverage emerging technologies for improved reliability and performance of our network environment. The remainder of the increase I am requesting is needed to support a variety of systems that are used for internal collaboration, business system performance measurement and other services provided by the IT Infrastructure teams.

D. Information Security (Shared)

1. Description of Costs and Underlying Activities

The Shared Information Security costs allocated to SDG&E cost centers represent labor and non-labor for activities performed that benefit SDG&E, SoCalGas and Corporate Center. These activities address a wide variety of cybersecurity and customer privacy risks and requirements. Activities performed by Information Security include, but are not limited to, overall governance, security architecture and strategy, customer privacy, organizational responsibility of information security process, operations, risk and compliance frameworks, enterprise security control implementation design patterns, security controls, validation and testing of technical controls, security event and incident monitoring, cyber forensics, intrusion prevention, public key infrastructure, log management, vulnerability assessment, identity access management, content filtering, and end point encryption.

Table SJM-12 summarizes the total Shared O&M Information Security forecast for costs charged to SDG&E cost centers. Although the vast majority of Information Security total costs are captured in SDG&E cost centers, there are also some Information Security costs captured in SoCalGas cost centers, as described in the testimony of SoCalGas IT witness Christopher Olmsted (Ex. SCG-18).

TABLE SJM-12

SDG&E

Shared O&M Information Security Costs

Shown in Thousands of 2013 Dollars Incurred Costs (100% Level)			
C. Information Security	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. Information Security	**3,589**	**5,613**	**2,024**
Incurred Costs Total	**3,589**	**5,613**	**2,024**

2. Cost Drivers

As discussed previously, a strong and effective Information Security Program is necessary to address the ongoing challenges related to cybersecurity risks. The increase in funding requested for this critical capability includes both labor and non-labor resources. Increased costs associated with ongoing software and hardware maintenance costs account for a significant portion ($703k) of the increased request for Information Security costs charged to SDG&E cost centers. Another large portion of the increased request ($525k) is for non-labor related to highly specialized services, such as vulnerability and penetration testing assessments, as well as forensics support. In addition, the requested increase includes $406k for threat intelligence and risk assessment activities. The remaining amount of the requested increase covers additional labor to support activities ranging from security awareness and training to product evaluations associated with new technology.

E. IT Support (Shared)

1. Description of Costs and Underlying Activities

The costs in Shared IT Support cover shared labor and non-labor expenses recorded by the Vice President of IT, a portion of the IT Associate program, which is a three-year program for newly hired IT employees that provides them with rotational assignments within the IT Division and the IT business planning and budgets organization.

Table SJM-13 summarizes the total Shared O&M IT Support forecast.

TABLE SJM-13

SDG&E

Shared O&M IT Support Costs

Shown in Thousands of 2013 Dollars Incurred Costs (100% Level)			
D. IT Support	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. IT Support	**5,308**	**5,343**	**35**

2. Cost Drivers

The cost drivers behind the increased request in Shared IT Support are for labor increases within the business planning group to accommodate one additional FTE that would be a participant in the Management Accounting Rotation Program ("MARP") and an increased amount of cross training for current employees.

IV. CAPITAL

A. Introduction

Table SJM-14 summarizes the total IT capital forecasts for 2014, 2015, and 2016. Table SJM-14 shows the full complement of IT capital projects being proposed by SDG&E in this filing. In other words, Table SJM-14 is composed of both business unit-sponsored IT capital projects, as well as IT Division-sponsored IT capital projects. The costs depicted in Table SJM-14 below are the total costs to be incurred by the proposed capital projects and charged to SDG&E cost centers. They do not reflect adjustments that may result due to sharing of project costs across SoCalGas and Corporate Center, if appropriate. Project specific cost sharing considerations are discussed in Section IV.B.5 of my testimony.

Included in Table SJM-14 are projects sponsored by the business units that include IT technology solutions to meet business demand. The business justifications for the business sponsored projects are included in the testimony of the associated business witnesses:

Customer Service Field	Franke (Ex. SDG&E-13)
Customer Service - Operations, Information, and Technologies	Baugh (Ex. SDG&E-14)
Electric Distribution	Jenkins (Ex. SDG&E-09)
Facilities	Seifert (Ex. SDG&E-17)
Procurement	Furbush (Ex. SDG&E-15)

My workpapers, as cross referenced by the witnesses above, contain the cost justifications for the IT portion of these business unit sponsored capital projects.

I provide additional information about IT Division-sponsored IT capital projects below in Section IV.C.

TABLE SJM-14

SDG&E

IT Capital Expenditures - Summary of Costs

INFORMATION TECHNOLOGY			
Shown in Thousands of 2013 Dollars			
Categories of Management	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
A. Customer Service Field	121	0	0
B. Customer Service - Operations, Information, and Technologies	26,743	26,317	15,579
C. Electric Distribution	15,029	5,954	2,372
D. Facilities	0	112	1,288
E. Gas Distribution	0	1,160	0
F. Procurement	2,658	2,438	986
G. Information Technology	49,723	26,103	15,163
Total	**94,274**	**62,084**	**35,388**

Additional information about the cost assumptions for several of the capital projects is provided in Appendix B of my testimony. Information on Commission decisions that impact certain capital projects and their cost assumptions is provided in Appendix D.

B. Capital Project Approval

Before an IT capital project is funded and moves into development, it must go through the Capital Project Approval process. The Capital Project Approval process has several distinct stages, as described below.

1. IT Division Capital Plan Development

First, the IT Division prepares a Capital Plan, which is the sum of proposed plans of IT and business sponsored projects that utilize IT capital budget. The Capital Plan includes both ongoing projects and anticipated needs. The Capital Plan is usually developed in the fourth quarter of a fiscal year in preparation for upcoming years. At this stage, the composite Capital Plan consists of a long list of viable capital projects, each with the potential to beneficially impact IT capability and services. Supporting documentation is developed by way of concept documents and business cases to be utilized as part of the prioritization and approval process.

2. Concept Documents

Concept documents (see Appendix A for a concept document summary template) are high-level assessments developed for review during the capital planning process. The concept document contains typical project elements such as cost estimates, business benefits and project

schedules. It also provides project teams the opportunity to document alternative options considered, as well as business risks and implications of not proceeding with the project. All of these elements are available for consideration during project prioritization and approval. The Central Business Planning group then decides whether to approve funding as part of its prioritization and approval process.

3. Project Prioritization and Approval

The concept documents provided by projects teams are utilized for prioritization purposes. Rankings are determined based on various factors including, but not limited to, regulatory requirements, critical service maintenance needs and/or cost benefit analyses. The projects in the narrowed Capital Plan list are then prioritized by likely impact on IT capability and services. The resulting prioritized list is submitted to the Central Business Planning group for funding approval. The annual capital budget allocation processes for SDG&E is administered by the Central Business Planning group on behalf of the Executive Finance Committee ("EFC"). Details of the capital planning process are presented in the testimony of our Rate Base witness Jesse Aragon (Ex. SDG&E-27).

4. Business Cases

Once funding is approved by the Central Business Planning group for a concept, a complete business case must be prepared and approved before work begins. Business cases are developed jointly by representative(s) from the sponsoring IT department, representative(s) from the sponsoring business department (when applicable) and a representative from the IT Project Management Office ("IT PMO"). Additional business case contributors, as required, may be included on the project team that is assigned to develop the business case. Typically, the responsibilities for developing specific aspects of the business case are handled as follows:

- The sponsoring IT department is primarily responsible for defining the project scope, identifying the technical approach, and generating the basis of estimate for the capital costs and ongoing O&M support costs.
- The business representatives are primarily responsible for confirming the business requirements, calculating the business benefits, and ensuring that the proposed solution meets the business objectives.

- The IT PMO ensures that the templates are completed correctly, that the budgets are calculated and characterized correctly, and that the proposed scope is consistent with policy.

A near final draft of the business case is provided to Information Security for review and comment. A sample business case template has been included in my supplemental workpapers (Ex. SDG&E-19-SWP).

5. Cost Sharing Mechanisms

A sharing mechanism must be determined for any project that will be utilized across SDG&E, SoCalGas, and/or Corporate Center. As part of the business case development, a project team will include a recommendation of how costs will be shared for consideration during the capital approval process based on the project team's assessment of project scope and the anticipated utilization across SDG&E, SoCalGas, and/or Corporate Center.

C. IT-Sponsored Capital Projects

The remainder of the IT capital costs I am requesting is for SDG&E IT-sponsored capital projects. The entire list of SDG&E IT division-sponsored IT capital projects is provided in Appendix C. I have listed the largest capital projects sponsored by SDG&E IT below in Table SJM-15. The individual projects listed in the table are estimated to be in excess of $2 million dollars each and cumulatively represent approximately 70% of the projected capital expenditures by the IT Division. I have included additional information about these projects below. Information on the remaining SDG&E IT-sponsored capital projects can be found in my capital workpapers, Exhibit SDG&E-19-CWP, as referenced below.

TABLE SJM-15

SDG&E

Capital Expenditures Summary of Costs – IT Projects Only

Shown in Thousands of 2013 Dollars				
Information Technology	**Work paper**	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
	(SDG&E-19-CWP)			
SDG&E Grid Communication System	**10874A**	**22,748**	**-**	**-**
Distributed Energy Resource Management	**10875M**	**7,102**	**8,760**	**625**
ADMS Phase 2	**10875N**	**3,798**	**1,020**	**-**
SDG&E Desktop Hardware Refresh	**00817B**	**-**	**2,184**	**2,484**
Smart Grid Data Analytics	**10875L**	**-**	**2,129**	**2,129**
Demand Response Management System	**10875O**	**1,300**	**1,497**	**200**
Condition Based Maintenance Analytics	**10875K**	**1,956**	**1,023**	**-**
Smart Grid Field Area Secure D	**10875G**	**-**	**1,065**	**1,803**
Smart Grid Transparent Field I	**11878A**	**909**	**909**	**909**
SDG&E Downtown SCADA Relocation	**00829D**	**2,320**	**143**	**-**
Smart Grid Substation Security	**10875J**	**-**	**897**	**1,350**
Smart Grid Secure Distributed	**10875H**	**-**	**897**	**1,323**
Sub-Total		**40,133**	**20,524**	**10,823**
Remaining IT Projects (see Appendix C)	**Various**	**9,590**	**5,579**	**4,340**
Total		**49,723**	**26,103**	**15,163**

1. SDG&E Grid Communication System

SDG&E Electric Transmission & Distribution has undertaken various SmartGrid initiatives aimed at automating various operations previously performed by manual inspection. Process automation requires new and updated telecommunications to carry field asset status back to the

Data Center. Options for fulfilling the varied monitoring requirements of key field assets will be investigated and implemented. Field workers currently performing manual inspections will be freed up to perform other more critical tasks. The automated processes will help the company detect problems in a timely fashion. New systems will provide capacity for some additional SmartGrid initiatives in the future.

The SDG&E Grid Communication System program will consist of implementing telecommunications in four areas: 1) Low Power Communications Network; 2) Substation Communications; 3) Field Broadband Connections; and 4) SCADA Optimization. These varied solutions should provide needed telecommunications for current, as well as additional future, initiatives (Ex. SDG&E-19-CWP-10874A). Additional information about the cost assumptions for this project is included in Appendix B.

2. Distributed Energy Resource Management ("DERMS")

The DERMS project will optimize resource utilization in response to system operational events, environmental and equipment conditions (collectively "reliability events"), and market price conditions. DERMS includes several different, but integrated, software components that incorporate advanced optimization algorithms to dispatch demand and supply side resources. (Ex. SDG&E-19-CWP-10875M).

Some of the drivers for this project include:

- Rapid growth in commercial and residential distributed energy resources ("DER") (e.g., rooftop PV);
- CPUC-mandated energy storage procurement targets; and
- Complexity in coordinating the operation of various DER spread across the grid.

DERMS will provide the following capabilities:

- Monitor, optimize and control DER in disparate locations to meet multiple business objectives (e.g., reliability and safety);
- Uses weather and load forecasting, price signals, demand response programs to provide multiple options for optimization and scenario-based operations of DER; and
- Integrations with ADMS to leverage the current electric connectivity model and coordinate device operation.

Additional information about the cost assumptions for this project is included in Appendix B.

3. Advanced Distribution Management System ("ADMS") Phase 2

The ADMS project will implement a new version of the Network Management System to support the integration of Distributed Energy Resources ("DERs") by taking advantage of their capabilities and maintain and enhance Distribution Management System functionality, while maintaining current Outage Management System/Distribution Management System integration and functionality. The benefits from Phase 2 of this project will be measured by improvements in reliability as measured by the System Average Interruption Duration Index ("SAIDI") and improvements in asset utilization from the integration with distributed energy resources. SAIDI improvements will result from quicker determinations of fault location and the development of plans to isolate the faulted area and restore customers. Improvements in asset utilization will result from monitoring the system load during peak periods and transferring load to avoid exceeding equipment limits. The SCADA simulator will also allow realistic testing of and training for the SCADA network. Improved reporting performance will allow for quicker outage and distribution management decisions and actions (Ex. SDG&E-19-CWP-10875N).

4. SDG&E Desktop Hardware Refresh

This hardware refresh program will proactively address anticipated technology obsolescence, reliability, and cost effectiveness concerns with our population of approximately 4,800 desktops and laptops. Beginning in 2015, once a desktop or laptop asset reaches its fifth year of service (i.e., the end of its warranty period), it will be replaced to ensure the business user has an asset that is fit for its purpose as well as to mitigate as many out-of-warranty failures as possible to ensure minimal impacts on user productivity (Ex. SDG&E-19-CWP-817B).

5. Smart Grid Data Analytics

The Smart Grid Data Analytics project will implement three new data sources for the load forecasting process and for planning power flow analysis. At a high level, the three new data sources include:

- Weather Normalizing and Adverse Factors data - Allows the use of historical weather data and weather models to determine weather normalizing and adverse factors for each substation and circuit.
- Net-metered Photo-Voltaic ("PV") Contribution data - Determines the contribution from net-metered PV generation for each circuit, using installed system nameplate capacities and output from nearby metered PV systems.

- Planning Power Flow Analysis data - Feeds Smart Meter data into SynerGEE, enabling the power flow analysis models to factor in actual loads on a circuit rather than using connected kVA distribution loads on a circuit.

The project will also upgrade SynerGEE client software to Version 5, which has better PV modeling and many other improvements. Finally, the project will deploy client workstations with a 64-bit OS and additional Random Access Memory ("RAM") to speed up modeling (Ex. SDG&E-19-CWP-10875L).

6. Demand Response Management System ("DRMS")

The existing Demand Response ("DR") Portfolio consists of 11 programs that are currently managed using a variety of different systems with mainly manual processes. There is no single view of the portfolio that allows management to make well-informed cost effective decisions for demand response.

The DRMS Project will enable the management of SDG&E's entire demand response portfolio with the following integrated capabilities: program management, enrollment, eligibility, device management, event management, forecasting, settlement, analytics/reporting and workflow. The full project implementation for all DR programs will take 2 to 3 years to complete with a phased approach. The first phase will implement functionality necessary to retire a high-cost application, APX; automated manual processes for ongoing benefits and provide the functionality needed to send text messaging to Home Area Network ("HAN") devices; provide two-way DR and price signals; and monitor HAN device connectivity. The subsequent phases will cover the remaining portfolio of DR programs and add the additional integrations necessary for an enterprise solution (Ex. SDG&E-19-CWP-10875O).

7. Condition Based Maintenance Analytics

The Condition Based Maintenance Analytics project will enhance the Condition Based Maintenance ("CBM") network for substation transformers. The project will co-develop algorithms and data analytics modules to provide a better assessment of overall condition of a substation. Project benefits include failure prevention, streamlined maintenance and the creation of accurate alerts and alarms. Ratepayers will benefit through improved distribution efficiencies (Ex. SDG&E-19-CWP-10875K).

8. Smart Grid Field Area Secure Device Monitoring and Management

As cybersecurity threats continue to increase, critical infrastructure operations need to ensure they can protect against and quickly respond to threats. The goal of the Smart Grid Field Area Secure Device Monitoring and Management project is to provide SDG&E the ability to detect, respond and mitigate security vulnerabilities and risks at the Smart Grid component level. This project will deploy technologies focused on monitoring the security health of Smart Grid Intelligent Electronic Devices ("IEDs"). In the event the security health of an IED changes, this technology will have the ability to quarantine and minimize the potential impact to SDG&E's Smart Grid and Electric Transmission and Distribution environments (Ex. SDG&E-19-CWP-10875G).

9. Smart Grid Transparent Field Intrusion Detection System/Intrusion Prevention System ("IDS/IPS")

The first phase of the IDS/IPS project includes the identification and evaluation of next generation network anomaly detection ("NAD") technologies capable of detecting anomalies, threats and attacks traversing SDG&E's field area networks ("FAN") and wide area networks ("WAN"). The project will evaluate SDG&E's network topology and identify key WAN and FAN networks where this NAD technology should be deployed, initially focusing on protecting critical networks and devices with the highest potential exposure. The NAD system will be integrated with established Information Security systems, such as log management infrastructure and security incident and event monitoring solution so events and alerts can be viewed and responded to by SDG&E's Security Operations Center ("SOC") (Ex. SD&GE-19-CWP-11878A).

10. SDG&E Downtown SCADA Relocation

The current SCADA Communications System in downtown San Diego must be removed from the existing Sempra Headquarters building at 101 Ash Street because Sempra Energy is relocating its Headquarters to another facility in downtown San Diego. We will evaluate a complete reconfiguration of the SCADA system. This project will install and configure a new backbone network for the existing SCADA infrastructure in downtown San Diego. The new SCADA System will provide increased capacity and accessibility, eliminate dependency on equipment currently located at the existing Headquarters location and allow long-term flexibility for the physical location of equipment at the new Headquarters location (Ex. SDG&E-19-CWP-829D).

11. Smart Grid Substation Security in a Box

As intelligent devices are being distributed throughout SDG&E's grid and residing within substation networks and wireless field area networks, SDG&E must also distribute security technologies to protect these computing assets. The assets being deployed in the field are evolving from simple hardware devices to hardened computing platforms running enterprise class operating systems and software. SDG&E must extend security services into these new substation and field networks. The Smart Grid Substation Security in a Box project will create the ability to extend security services to networks and assets outside of our primary internal network, provide security services in disaggregated, disconnected and low bandwidth scenarios and assist in maintaining our security posture in remote or disconnected sites (Ex. SDG&E-19-CWP-10875J).

12. Smart Grid Secure Distributed Network Protocol

Currently our SCADA applications leverage a standard communications protocol, Distributed Network Protocol Version 3 ("DNP3"), for communicating to remote terminal units ("RTU") and intelligent electronic devices ("IED"), none of which have built-in security mechanisms. The Smart Grid Secure Distribution Network Protocol project is designed to enhance SDG&E's capabilities to support the Institute of Electrical and Electronics Engineers' ("IEEE") latest version of the DNP3 protocol 1815:2012 as well as ensure that our RTU and IED vendors conform to this version. This is necessary because in this new version of the protocol is a feature called Secure Authentication, which will allow SDG&E to properly authenticate and ensure integrity of the DNP3 communications. The project scope will include setting up a secure DNP3 certificate authority to issue proper certificate types, as well as establishing a test environment (Ex. SDG&E-19-CWP-10875H).

V. CONCLUSION

This concludes my prepared direct testimony.

VI. WITNESS QUALIFICATIONS

My name is Stephen J. Mikovits and I currently serve as the Director for Application Services at SDG&E. In this role, I am responsible for the development and maintenance of application solutions related to the customer services, electric operations and electric and fuel procurement lines of business at SDG&E.

I have been a member of the IT Division since 1985. I have held multiple positions during my career, all of which have focused on delivering IT-related services. I have held positions at both SoCalGas and SDG&E, and have held various roles of increasing responsibility over the years, including more recently as the IT Program Manager of the Smart Meter Program (2007 to 2009 at SDG&E) and Director for Information Security & Information Security Compliance (2009 to 2012 at SDG&E).

I received a Bachelor of Science degree in Math/Computer Systems from the University of California at Los Angeles in 1985.

I have previously testified before the California Public Utilities Commission.

APPENDIX A

SEU IT PROJECT CONCEPT DOCUMENT TEMPLATE – SUMMARY PAGE

SDG&E IT Project Concept Document Summary Page Template

Project Name and Contacts			Version 4.06
Project Name			
Primary Funding Source	**Choose One**	**Priority Group**	
IT / Non IT Funded	IT	**Business VP Organization**	
IT Director Sponsor		**Business VP Sponsor**	
IT Line Manager		**Business Director Sponsor**	
IT Project Manager		**Business Line Manager**	
Last Updated Date		**Business Project Manager**	

Project Description and Details	on Continued" worksheet if additional space is required
Project Description: Describe the business problem and the options that will be investigated to solve the problem.	
Project Scope: Provide a brief description of the project's scope.	
Project SOFT Benefits: Provide a brief description of the project's soft benefits.	
Project 'Base' Estimate Assumptions:	
Project 'High' Estimate Assumptions:	
Project 'Low' Estimate Assumptions:	
Project Risks:	
Must Complete By: Complete date & reason (If applicable)	
Dependencies TO: If this project depends on OTHER project, name other project	
Dependencies FROM: If OTHER project depends on this project, name other project	
Business Implications of NOT Implementing Project:	
Privacy: Does the project involve creating, accessing (or allowing another to access), storing, sharing or disposing customer information?	

SDG&E IT Project Concept Document Summary Page Template

Project Estimate and Dates Summary

Funding - See Business Planning for Questions			**Loaders-** (Loaders highlighted in yellow apply to Capital and O&M)	
	Contingency	0.00%	**Loader Source:**	SDGE
Asset Allocation	SDGE	0%		**Labor Loader**
	SCG	0%		**Non-Labor Loader**
	Corp	0%		**Admin & General Loader**
	Total	0%		**AFUDC**

Dates and Milestones

Business Case Start		**Milestones** Significant milestones on a quarterly basis	
Business Case Completion			
Project Start			
Project In Service Date			
Project Complete			

Project Costs (Complete 2-Annual Estimate worksheet to populate Base estimate)

Labor SDS %	0%	IRR %	Less than 0%	**Loaded Estimate** (In Thousands)		
Non Labor SDS %	0%	NPV $	#REF!	**Low**	**High**	**Base**
O&M	Business Case Development O&M			$0	$0	$0
	Project Incremental O&M			$0	$0	$0
	Administrative & General Loader			$0	$0	$0
	SubTotal Estimate			$0	$0	$0
Capital	Project Capital			$0	$0	$0
	Administrative & General Loader			$0	$0	$0
	SubTotal Estimate			$0	$0	$0
	AFUDC			$0	$0	$0
	SubTotal Estimate + AFUDC			$0	$0	$0

Annual Benefits and Costs (Post Project) (Complete 2-Annual Estimate worksheet to populate Base Estimate)

	Loaded Estimates Including A&G (In Thousands)			
Asset Life Years	5	**Low**	**High**	**Base**
Total Benefits		$0	$0	$0
Total Incremental O&M		$0	$0	$0
Total Benefits - Total O&M		$0	$0	$0
Average Yearly Benefits or O&M Cost		$0	$0	$0

SDG&E IT Project Concept Document Summary Page Template

Project Scores

Operational Necessity
Select all that apply

Score	Category	Anchors
0	Mandated	Project is mandated, the proposed solution is the only viable option, and: 20 - Delay is a realistic option; highly unlikely or minimal penalties - and - no significant negative publicity for non-compliance or there is a less expensive solution. 40 - Delay is a potential option; penalties and/or negative publicity are significant but very unlikely to occur. 75* - Delay is not an option; substantial penalties -and/or - negative publicity for non-compliance will occur
		Provide the name of the legal, regulatory, fed., state agency or internal policy (info. security, etc.) requiring this work, and any penalties that will be incurred:
0	Capacity	***Skip section if mandated = 75** Capacity for the existing application, infrastructure or business processes: 10 - is at risk of not meeting significant business requirements, but we can wait 1 to 2 years before starting work 20 - is at risk of not meeting significant business requirements and work must start within 12 months 30 - is currently unable to function at business-acceptable levels
0	Reliability	***Skip section if mandated = 75** The project is being pursued to increase application or infrastructure reliability where: 10 - The existing application and/or infrastructure is approaching it's end of useful life but work can start within 1 to 2 years. 20 - The existing application and/or infrastructure is approaching it's end of useful life and work must start within 12 months. 30 - The existing application and/or infrastructure has reached it's end of useful life and business processes are currently at risk
1	**Operational Necessity Score.** Note: Default Score = 1	

Economic Justification. Note: Default Score = 1

1	**Economic Justification (Calculated)**	1 - Payback > 10 years 20 - Payback > 6 years to <= 10 years 40 - Payback > 4 years to <= 6 years	60 - Payback >= 2 years to <= 4 years 80 - Payback < 2 years **100 - Financial penalty and/or negative publicity avoided if compliant with mandate.**

Business Opportunity/Value
Can project support/enable specific SEu Objectives:

Score	Category	Anchors
0	Operational Excellence for our Core Business	The project will help achieve operational excellence for our core business by: 20 - Leveraging technology and system re-engineering to increase efficiency and reduce costs 40 - Supporting the execution of major projects/initiatives (enabling major projects/programs such as OpEx, Advanced Meter) 60 - Creating opportunities to improve employee and/or customer safety (such as Pipeline Integrity)
0	Maximize Technology	This project or IT strategic initiative will enable us to maximize technology for SEu by: 20 - Creating new business growth opportunities (new products and/or services) 40 - Enhancing our customer experience/interactions
1	Business Opportunity/Value Score. Note: Default Score = 1	

APPENDIX B

CAPITAL PROJECTS – BASIS ASSUMPTIONS (SELECT PROJECTS)

SDG&E Project

Work Paper ID	831N
Project Name	CCA - Community Choice Aggregation
Version	1

Basis of Estimate

Component or Phase	Release 1.1		
Description	Community Choice Aggregation (CCA) permits cities and counties to provide electricity commodity to customers located within their jurisdiction. Under CCA, SDG&E would be required to provide basic CCA implementation services as well as ongoing support, including, SDG&E consolidated billing for all CCA customers within their boundaries and ongoing Direct Access Storage Reporting (DASR) communications between the CCA and SDG&E.		
Labor Estimate	$2,661,000	Basis Type	Parametric
Basis Explanation	The estimates were based upon the professional judgment and experience of subject matter experts (SME) of the existing systems impacted by implementing CCA. The SME's were provided system requirements. Workshops were held to review those requirements and discuss solutions. Subject matter experts estimated the labor hours required to implement each requirement.		
Non-Labor Estimate			
Basis Explanation	$0	Basis Type	None.

SDG&E Project

Work Paper ID	07864B
Project Name	SDG&E Construction, Planning and Design (CPD) Enhancements Phase 1
Version	1

Basis of Estimate

Component or Phase	System Deployments		
Description	The Construction, Planning and Design (CPD) Enhancements Phase 1 project is a follow-on project to the OpEx CPD project. The original OpEx CPD project began in mid-2010 as the final project of the OpEx program. The CPD system is primarily comprised of SAP, Click Software and Schneider Electric Graphic Work Design (GWD) integrated software as well as interfaces with several legacy systems. CPD replaces the existing construction work management system (DPSS) which has reached end-of-life. The first deployment of CPD was completed on July 29, 2013 at Metro (529 users). The scope of the CPD Enhancements Phase 1 project is to complete all remaining deployments as well as implement a number of system enhancements. The deployments in scope of this project are as follows: Region — Deployment Date — Number of Users Beach Cities (SAP) — May 12, 2014* — 285 Eastern (SAP) — June 23, 2014* — 138 Northcoast (SAP) — August 23, 2014* — 158 Northeast (SAP) — September 15, 2014* — 194 Orange County (SAP) — October 20, 2014 * — 79 GWD – Gas — October, 2014* — 24 GWD – Electric — Mid-2015 — 116 *As of November 5th, all deployments have been completed as planned on the dates depicted above.		
Labor Estimate	$1,098,000	Basis Type	Analogous
Basis Explanation	To complete all remaining deployments, estimated that a project staff comparable in size to the original CPD implementation project would be necessary. Based on this experience with the prior deployment on July 29, 2013, it was determined that approximately 12 full-time equivalent (FTE) employees are necessary to support the deployment schedule shown above. Total labor projected for 2014 (including enhancement activities described below) is $3.18 million. Year-to-date labor spending through June 30, 2014, on both deployments and enhancements is $1.57 million.		
Non-Labor Estimate	$4,952,000	Basis Type	Analogous
Basis Explanation	Based on initial OpEx CPD implementation project, estimated that on average 33 contractors (16 FTE's) are necessary for portions of their time to complete deployments as well as complete enhancements described below. Estimates were based on known contractor rates and estimated hours from two primary vendors that participated on the initial OpEx CPD project. The two primary vendors, in addition to several smaller vendors, continue to provide contractors on the CPD Enhancement Phase 1 project. Total non-		

	labor projected for 2014 (including enhancement activities described below) is $8.2 million. Year-to-date non-labor spending on both deployments and enhancements is $3.0 million. Non-labor CPD spending will increase during the remainder of the year due to several sub-projects that are beginning.

Component or Phase	System Enhancements		
Description	The Construction, Planning and Design (CPD) Enhancements Phase 1 project is a follow-on project to the OpEx CPD project. The original OpEx CPD project began in mid-2010 as the final project of the OpEx program. The CPD system is primarily comprised of SAP, ClickSoftware and Schneider Electric Graphic Work Design (GWD) integrated software as well as interfaces with several legacy systems. CPD replaces the existing construction work management system (DPSS) which has reached end-of-life. In addition to completing remaining deployments described above, the scope of this project includes completing enhancements to improve system functionality for end-users. During the months following initial deployment in 2013, enhancements have been logged, prioritized and completed. From January 1, 2014, through June 30, 2014, 248 enhancements have been completed specifically relating to SDG&E as well as 80 that benefit both SDG&E and SCG.		
Labor Estimate	$2,341,000	Basis Type	Analogous
Basis Explanation	To complete enhancements in addition to remaining deployments discussed above, estimated that a project staff comparable in size to the original CPD implementation project would be necessary. Based on the number of employees assigned to the OpEx CPD project we estimated that approximately 26 full-time equivalent (FTE) employees are necessary to support enhancement delivery activities. Many enhancements are very complicated and require a number of individuals to define requirements, work with developers to design changes, develop solutions, test and rollout to end-users.		
Non-Labor Estimate	$5,109,000	Basis Type	Analogous
Basis Explanation	Based on initial CPD implementation project, estimated that on average 33 contractors (17 FTE's) are necessary for portions of their time to complete enhancements as well as complete remaining deployments described above. Estimates were based on known contractor rates and estimated hours from two primary vendors that participated on the initial CPD project. The two primary vendors, in addition to several smaller vendors, continue to provide contractors on the CPD Enhancement Phase 1 project. Non-labor CPD spending will increase during the remainder of the year due to several sub-projects that are beginning.		

SDG&E Project

Work Paper ID	10875M
Project Name	DERMS
Version	1.0

Basis of Estimate

Component or Phase	DERMS 2014		
Description	Includes Spirae BlueFin software license; all labor, hardware and services required to design, build, test, and deploy BlueFin software components for implementation in 2014, a portion of the labor and services required to design and build BlueFin software scheduled for implementation in 2015		
Labor Estimate	$427K	Basis Type	Analogous
Basis Explanation	The internal labor estimates were based on business and IT resource forecasts that were similar to implementing the Visualizer functionality of the Borrego Microgrid Project.		
Non-Labor Estimate	$6,613K	Basis Type	Quote/Analogous
Basis Explanation	The vendor professional service labor estimates were based on vendor quotes. The software license, vendor professional services, and field hardware were based on vendor quotes. The data center hardware and software were based on analogous costs on Development, Lab, and Production environments for a typical IT project. The security testing was also based on similar costs compared to similar efforts.		

Component or Phase	DERMS 2015		
Description	Includes Spirae BlueFin software extensions; all labor, hardware and services required to design, build, test, and deploy BlueFin software components for implementation in 2015, a portion of the labor and services required to design and build BlueFin software scheduled for implementation in 2016		
Labor Estimate	$875K	Basis Type	Analogous
Basis Explanation	The internal labor estimates were based on business and IT resource forecasts that were similar to implementing the Visualizer functionality of the Borrego Microgrid Project.		
Non-Labor Estimate	$7,758K	Basis Type	Quote/Analogous
Basis Explanation	The vendor professional service labor estimates were based on vendor. The software development, vendor professional services, and field hardware were based on vendor quotes. The data center hardware and software were based on analogous costs on Development, Lab, and Production environments for a typical IT project. The security testing was also based on similar costs compared to similar efforts. The vendor professional services were based on a rate card negotiated as part of the ADMS2 project. The test management services were based on similar costs compared to similar efforts.		

Appendix B
Capital Projects - Basis Assumptions

Component or Phase	DERMS 2016		
Description	Includes Spirae BlueFin software extensions; all labor, and services required to test and deploy BlueFin software components for implementation in 2016.		
Labor Estimate	$365K	Basis Type	Analogous
Basis Explanation	The internal labor estimates were based on business and IT resource forecasts that were similar to implementing the Visualizer functionality of the Borrego Microgrid Project.		
Non-Labor Estimate	$207K	Basis Type	Quote/Analogous
Basis Explanation	The vendor professional service labor estimates were based on vendor quotes. The software development and vendor professional services were based on vendor quotes.		

SDG&E Project

Work Paper ID	831P
Project Name	SDG&E My Account Accessibility
Version	4

Basis of Estimate

Component or Phase	Release 1		
Description	Release 1 introduced new WebCenter technology for My Account by creating a new Home Page with Account Summary, introducing content management, redesigning the Electronic Bill Payment Processing (EBPP) pages and introducing the new navigation across the system. The pages will be redesigned to meet Web Content Accessibility Guidelines (WCAG) version 2.0 AA as required by §4.3 of the 2008 GRC Memorandum of Understanding (MOU) with the Disability Rights Advocates.		
Labor Estimate	$173,658	Basis Type	Actuals
Basis Explanation	Actual labor costs for January through March 2014. Release 1 was released to production in March 2014.		
Non-Labor Estimate	$950,765	Basis Type	Actuals
Basis Explanation	Actual contract costs for January through March 2014. All of these costs were for consulting labor.		

Component or Phase	Release 2		
Description	Release 2 includes moving the following My Account sections from the obsolete WebLogic Portal technology to WebCenter portal technology: Manage My Account, Contact Us, Registration, Forgot (User/Password), My Energy, Rate Enrollment/Rate Comparison, Alerts and Subscriptions, Go Paperless, and Letters of Residency and Credit History. The pages will be redesigned to meet Web Content Accessibility Guidelines (WCAG) version 2.0 AA as required by §4.3 of the 2008 GRC Memorandum of Understanding (MOU) with the Disability Rights Advocates. Costs are for the period April 2014 through October 2014.		
Labor Estimate	$453,192	Basis Type	Parametric
Basis Explanation	The labor estimate is based on the actual employees assigned to the project. Release 2 consists of eight three week development sprints, one six week hardening sprint and a two week storm period. The full time employees on the team are the Project Manager, Product Owner, two Business Analysts, and two Developers. Based on a standard $50/hour for employees, the average number of FTEs on this release is 7.1. There are 6 full time employees on the project and the additional 1.1 equivalent represents effort from the various information technology groups that provide less than full time support to the project. These groups include, but are not limited to, server support, network, database administration and information security.		

Non-Labor Estimate	$2,297,015	Basis Type	Contract
Basis Explanation	Contract costs based on signed agreements. Both vendor agreements include statements of work which contain descriptions of the tasks and deliverables. Temporary labor agency will provide staff augmentation resources to fill temporarily required positions.		

Component or Phase	Release 3		
Description	Release 3 includes moving the final My Account sections from the obsolete WebLogic Portal technology to WebCenter portal technology: Start/Stop/Move Service Orders, Gas Appliance Service Orders, Payment Arrangements, and Green Button Connect My Data. The pages will be redesigned to meet Web Content Accessibility Guidelines (WCAG) version 2.0 AA as required by §4.3 of the 2008 GRC Memorandum of Understanding (MOU) with the Disability Rights Advocates. Costs are for the period November 2014 through April 2015.		
Labor Estimate	$410,754	Basis Type	Parametric
Basis Explanation	The labor estimate is based on the actual employees assigned to the project. Release 3 consists of six three week development sprints, one four week hardening sprint and a two week storm period. The full time employees on the team are the Project Manager, Product Owner, two Business Analysts, and four Developers. Based on a standard $50/hour for employees, the average number of FTEs on this release is 9.3. There are 8 full time employees on the project and the additional 1.3 equivalent represents effort from the various information technology groups that provide less than full time support to the project. These groups include, but are not limited to, server support, network, database administration and information security.		
Non-Labor Estimate	$1,855,011	Basis Type	Contract
Basis Explanation	Contract costs based on signed agreements. Both vendor agreements include statements of work which contain descriptions of the tasks and deliverables. Temporary labor agencies provide staff augmentation resources to fill temporarily required positions.		

SDG&E Project

Work Paper ID	10874A
Project Name	SDGE Grid Communications System (SGCS)
Version	1.0

Basis of Estimate

Component or Phase	Substation Communications (SUBCOMM)		
Description	Expansion of SDG&E's Wide Area Network (WAN) to connect additional 17 substations via microwave and last-mile fiber. Also includes implementation of substation Local Area Networks (LANs) which will consist of serial-to-IP conversion at the end point equipment within these substations.		
Labor Estimate	$421,666	Basis Type	Analogous
Basis Explanation	Estimates developed in conjunction with integration vendor with previous experience in similar Substation connection projects		
Non-Labor Estimate	$22,429,411	Basis Type	Analogous
Basis Explanation	Estimates developed in conjunction with integration vendor with previous experience in similar Substation connection projects		

Component or Phase	Field Broadband Device Connections (FBDC)		
Description	Broadband connections at 100 targeted pole locations to support Phasor Measurement Units (PMUs) and other applicable, high-speed, Smart Grid devices that are installed on distribution circuits.		
Labor Estimate	$79,188	Basis Type	Analogous
Basis Explanation	Estimates developed in conjunction with integration vendor with previous experience in similar broadband construction projects		
Non-Labor Estimate	$9,748,747	Basis Type	Analogous
Basis Explanation	Estimates developed in conjunction with integration vendor with previous experience in similar broadband construction projects		

Component or Phase	SCADA Optimization & Enhancements (SCADA)		
Description	Implement an IP Wireless Narrowband SCADA System to increase system capacity and enhance electric grid operations at 17 locations.		
Labor Estimate	$333,621	Basis Type	Analogous
Basis Explanation	Estimates developed in conjunction with integration vendor with previous experience in similar SCADA construction projects		
Non-Labor Estimate	$5,337,208	Basis Type	Analogous
Basis Explanation	Estimates developed in conjunction with integration vendor with previous experience in similar SCADA construction projects		

Component or Phase	Low Power Communications Network (LPCN)		
Description	Implement 110 proprietary wireless access points which operate on unlicensed 2.4 GHz band and provide low speed, low power, wide area backhaul communications for Smart Grid monitoring devices.		
Labor Estimate	$200,791	Basis Type	Ratio
Basis Explanation	Estimates developed in conjunction with integration vendor with previous experience in similar wireless access point construction projects		
Non-Labor Estimate	$2,831,696	Basis Type	Analogous
Basis Explanation	Estimates developed in conjunction with integration vendor with previous experience in similar wireless access point construction projects		

Component or Phase	SGCS Program Management Office (PMO)		
Description	Provides overall program management, reporting, and financial support for all SDGE Grid Communications initiatives		
Labor Estimate	$185,921	Basis Type	Ratio
Basis Explanation	Estimates were developed based upon support costs incurred in previous SGCS phases		
Non-Labor Estimate	$202,001	Basis Type	Ratio
Basis Explanation	Contract labor estimates were developed based upon support costs incurred in previous SGCS phases.		

APPENDIX C

IT DIVISION-SPONSORED IT CAPITAL PROJECTS FOR SDGE

Shown in Thousands of 2013 Dollars				
Information Technology	**Work paper (SDG&E - 19 - CWP)**	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
SDGE GRID COMMUNICATIONS SYSTEM (SGCS)	10874A	22,748	-	-
Distributed Energy Resource Management (DERMS)	10875M	7,102	8,760	625
ADMS Phase 2	10875N	3,798	1,020	-
SDGE Desktop Hardware Refresh	817B	-	2,184	2,484
Smart Grid Data Analytics	10875L	-	2,129	2,129
DRMS (Demand Response Management System) - Phase 1	10875O	1,300	1,497	200
Condition Based Maintenance Analytics	10875K	1,956	1,023	-
Smart Grid Field Area Secure Device Monitoring and Management	10875G	-	1,065	1,803
Smart Grid Transparent Field IDS/IPS	11878A	909	909	909
SDGE Downtown SCADA	829D	2,320	143	-
Smart Grid Substation Security In a Box	10875J	-	897	1,350
Smart Grid Secure Distributed Network Protocol	10875H	-	897	1,323
Smart Grid Security Incident and Event Management (SIEM)	10875I	-	897	897
SDGE LAND MOBILE RADIO	829F	1,574	-	-
SDG&E Data Warehouse Upgrade	817A	-	-	1,529
Smart Grid Critical Infrastructure Cybercity	10875A	1,482	-	-
Smart Grid Cybersecurity Training Environment	10875B	1,441	-	-
Smart Grid Log Management	11878C	-	754	572
SDGE CI Small Cap Projects	829B	380	380	380
2014 SDG&E Microwave Upgrade and Enhancement	829C	52	959	88
IT Financial Planning	03851C	-	989	-
SDGE SCADA Log Management	829G	771	-	-
SDG&E SCADA Log Management Expansion	827A	757	-	-
SORT Refresh	833C	-	497	243
SDGE WAN REBUILD PHASE IV	08869A	727	-	-
Mobile Command Trailer Enhancement	829E	541	148	-
Smart Grid Field Network Access Control	11878D	-	-	473
Smart Grid - Substation Security	10875E	444	-	-
PostgreSQL OpenSource DBMS	835A	-	402	-
SDGE Video-enabled Collaboration Room Upgrade	827D	-	395	-
Generation IS Equipment Refresh	827B	329	-	-
Remote Server Rooms	827C	-	158	158
SDGE Windows 7 Platform Replacement	10877A	304	-	-
SDG&E WebLogic Integration	03851E	294	-	-
CISCO DATA RETENTION	833S	139	-	-
Smart Grid - Threat Intelligence	10875F	139	-	-
Smart Grid - Security Compliance Management Phase 1	10875D	126	-	-
Smart Grid DIIS Phase 2	10875C	90	-	-
Grand Total		**49,723**	**26,103**	**15,163**

APPENDIX D

COMMISSION DECISIONS RELEVANT TO BUSINESS JUSTIFICATIONS FOR IT CAPITAL PROJECTS

Appendix D

Commission Decisions Relevant to Business Justifications for IT Capital Projects

Workpaper	Project Name	CPUC Ruling	Relevant Language	Notes
03849A	CEN Phase 4	D.13-09-025 http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M077/K191/77191980.PDF	OP#18: "Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), and San Diego Gas & Electric Company (SDG&E) are authorized to file a Tier 1 advice letter seeking approval of tariffs offering the proposed data access services within 180 days of the adoption of this decision. PG&E, SCE, and SDG&E shall collaborate with each other, with third parties seeking the data, and with relevant standards-related organizations to develop common tariffs that, to the extent possible, are substantially similar in terms of standards, data platforms, data types, procedures for access to data by third parties, and methods of interacting with customers."	SDG&E filed Advice Letters 2586-E and 2586-E-A in compliance with D.13-09-025. http://regarchive.sdge.com/tm2/pdf/2586-E.pdf http://regarchive.sdge.com/tm2/pdf/2586-E-A.pdf
03851D	GRC Phase 2	D.14-01-002 http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M086/K541/86541422.PDF	OP#6: "Within 30 days of this decision, San Diego Gas & Electric Company shall submit a Tier 2 advice letter in compliance with General Order 96-B. The advice letter shall include revised tariff sheets to implement the revenue allocations and rate designs adopted in this order. The tariff sheets shall become effective no earlier than January 1, 2014, subject to the Commission's Energy Division determining that they are in compliance with this order. No additional customer notice need be provided pursuant to General Rule 4.2 of General Order 96-B for this advice letter filing."	The provisions adopted by D.14-01-002 required SDG&E to modify its customer systems to accommodate the new rate structures, such as implementing a demand charge for small commercial and agricultural customers. Although OP#6 of D.14-01-002 ordered an effective date of January 1, 2014, the decision was not adopted until January 16, 2014. SDG&E filed the revised tariff sheets by Advice Letters 2595-E and 2595-E-A which were approved by the Energy Division effective May 1, 2014. http://regarchive.sdge.com/tm2/pdf/2595-E.pdf http://regarchive.sdge.com/tm2/pdf/2595-E-A.pdf
04843A	Smart Meter IT Phase 3 Billing	D.07-04-043 as modified by D.11-03-042 http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/66766.PDF http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/132884.PDF	D.07-04-043, OP#5 authorized the Advanced Metering Infrastructure Balancing Account (AMIBA) as modified by D.11-03-042, OP#1: "Ordering Paragraph 5 of Decision 07-04-043 is modified to read: SDG&E shall establish the Advanced Metering Infrastructure Balancing Account (AMIBA) by an advice letter no later than 30 days from the effective date of this decision, and record costs up to $617 million. *The AMIBA shall remain in effect until such time as SDG&E completes the deployment of its Advanced Metering Infrastructure system and the final costs and benefits of the Advanced Metering Infrastructure system can be reported in an SDG&E general rate case.* (Italicized language added to Ordering Paragraph 5.)"	The current AMIBA was filed by SDG&E filed Advice Letter 2271-E in compliance with D.11-03-042. http://regarchive.sdge.com/tm2/pdf/2271-E.pdf
00831N-PT14065	Community Choice Aggregation	D.04-12-046 and D.05-12-041 http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/42389.PDF	D.04-12-046, OP#9: "In all respects, utility tariffs shall permit CCAs to initiate service immediately following the filing of tariffs described in Ordering Paragraph 2."	SDG&E filed Advice Letter 1665-E in compliance with D.04-12-046 and Advice Letter 1773-E-A in compliance with D.05-12-041. http://regarchive.sdge.com/tm2/pdf/1665-E.pdf

		http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/52127.PDF	D.05-12-041, OP#1: "Pacific Gas and Electric Company (PG&E), San Diego Gas & Electric Company (SDG&E), and Southern California Edison Company (SCE) shall file tariffs in compliance with this order no later than 60 days from the effective date of this order."	http://regarchive.sdge.com/tm2/pdf/1773-E-A.pdf
10872A	Smart Peak Pricing	D.12-12-004 http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M040/K655/40655276.PDF	D.12-12-004, P2: "This decision adopts a limited set of time-varying electric rates to be offered to residential and small commercial customers of San Diego Gas & Electric Company (SDG&E). Time-varying rates, including time-of-day rates, are electric rates under which the amount customers pay for each unit of electricity varies over the course of a day. Such rates are intended to motivate customers to reduce their electricity use during times of peak electricity demand by more closely reflecting the higher costs of electricity at those times. SDG&E is authorized to collect up to $92.7 million to fund the implementation of dynamic pricing and the associated activities adopted here. In addition, this decision requires SDG&E to implement specified education and outreach measures, and report on its expenditures, implementation, and education efforts. " OP#16: "Within 15 days of this decision, San Diego Gas & Electric Company shall file a Tier 2 advice letter establishing its Dynamic Pricing Balancing Account, and transferring the balance in its existing Dynamic Pricing Memorandum Account to its new Dynamic Pricing Balancing Account. Costs related to this decision, not to exceed the total approved budget of $92.7 million, shall be recorded in this account. In this advice letter, SDG&E shall propose the proportion of this total budget that should be used for capital and O&M expenditures, and how the budget will be distributed among activities."	SDG&E filed Advice Letter 2447-E to establish the Dynamic Pricing Balancing Account. The non-residential time-varying rates were implemented by Advice Letters 2577-E and 2577-E-A effective May 1, 2014. SDG&E will file an advice letter in November to implement the residential time-varying rates effective January 1, 2015. http://regarchive.sdge.com/tm2/pdf/2447-E.pdf http://regarchive.sdge.com/tm2/pdf/2577-E.pdf http://regarchive.sdge.com/tm2/pdf/2577-E-A.pdf
13849A	Reduce Your Use Opt-In	D.13-07-003 http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M071/K738/71738068.PDF	OP#8: "San Diego Gas &Electric Company (SDG&E) and Southern California Edison Company (SCE) shall file Tier One Advice Letters revising their Peak Time Rebate program tariffs appropriately to indicate the revision from default programs to programs that can be chosen by a residential customer. SDG&E and SCE shall file the Tier One Advice Letters no later than February 1, 2014."	SDG&E filed advice letter 2571-E in compliance with D.13-07-003 which was approved by the Energy Division effective May 1, 2014. http://regarchive.sdge.com/tm2/pdf/2571-E.pdf
12051	SDG&E My Account Accessibility	D.08-07-046 http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/86024.PDF	OP#1: "The Test Year 2008 Settlement for San Diego Gas & Electric Company (SDG&E), in Appendix 1, is adopted without modification."	See section 4.3 of the Memorandum of Understanding between SDG&E and the Disability Rights Advocates (Appendix 10 to D.08-07-046) http://docs.cpuc.ca.gov/PublishedDocs/PUBLISHED/GRAPHICS/86

				014.PDF
13021	CPP-D	D.08-02-034 http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/79422.PDF	OP #1: "The November 1, 2007 motion of San Diego Gas & Electric Company (SDG&E), which requests adoption of the October 17, 2007, 'TY2008 General Rate Case Phase 2 Settlement' (settlement) is granted, and the terms of the settlement appended to the motion as Attachment 1 are adopted and shall govern all of the revenue allocation, rate design, and critical peak pricing issues raised in this proceeding."	SDG&E filed Advice Letter 1978-E in compliance with D.08-02-034. The CPP-D project will address medium-sized customers who now have the appropriate metering required by Special Condition 19 of SDG&E's EECC-CPP-D tariff. http://regarchive.sdge.com/tm2/pdf/1978-E.pdf

APPENDIX E
GLOSSARY OF TERMS

APPENDIX E

GLOSSARY OF TERMS

The following list includes all abbreviations and terms used in my testimony and/or workpapers.

TERM	ACRONYM	DESCRIPTION
Advanced Distribution Management System	ADMS	An IT project that will enhance the level of automation used to operate and manage the Electric Distribution Network.
Customer Information System for Corporate Objectives	CISCO	An IT system used to manage customer account information and billing related activities.
Cloud Computing	---	A type of system architecture that uses shared infrastructure (a "cloud") to support multiple software applications. Traditionally, high-performance IT applications used dedicated, single-purpose computing infrastructure – e.g. dedicated servers and storage for that single application. A computing cloud can be external (sold by a service provider) or internal (hosted by the end-use company).
Condition Based Maintenance	CBM	An IT system used to monitor substation transformers.
Construction Planning and Design	CPD	Project that integrates planning, sketching, supply management, accounting and project costing for large construction projects.
Customer Energy Network	CEN	An IT system used to enable the sharing of energy consumption data with 3rd party vendors, based on SDG&E customer preferences.
Customer Relationship Management	CRM	An IT system used to manage and track customer eligibility for specialized programs and services provided by SDG&E.
Demand Response	DR	A type of program used by SDG&E to manage customer consumption of electricity in response to supply conditions.
Distributed Energy Resources	DER	A device that produces electricity, and is connected to the electrical system, either "behind the meter" on the customer's premise, or on SDG&E's primary distribution system.
Distributed Energy Resource Management System	DERMS	An IT system that will provide automation support for optimizing demand and supply side resource utilization in response to SDG&E electric distribution system operational events, environmental and equipment conditions and market price conditions.
Distributed Network	DNP3	A set of communications protocols used between

Protocol Version 3		components in process automation systems. It plays a crucial role in SCADA systems, where it is used by SCADA Master Stations (i.e., Control Centers), Remote Terminal Units ("RTUs"), and Intelligent Electronic Devices ("IEDs").
Demand Response Management System	DRMS	An IT system that will provide automation support for the management of SDG&E's demand response portfolio.
Enterprise Risk Management	ERM	A formalized approach at SDG&E that includes a comprehensive risk management policy and guidelines, with defined, substantive roles and responsibilities established throughout the organization and transparent repeatable processes to support assessment of key risks.
Executive Finance Committee	EFC	Committee comprised of senior management leadership that is responsible for financial decisions at SDG&E.
Field Area Network	FAN	A communication network used to support the electric distribution grid and especially use cases such as advanced metering infrastructure, distribution automation, distributed generation, and workforce automation.
Full Time Equivalents	FTE	A unit that indicates the workload of an employed person in a way that makes workloads comparable across various contexts.
General Order 95	GO 95	A California Public Utilities Commission ruling related to the Rules for Construction and Maintenance of Overhead and Underground Electric Supply and Communication Systems
Geographic Information System	GIS	Computer system designed to capture, store, manipulate, analyze, manage, and present all types of geographical data.
Home Area Network	HAN	A type of local area network that is used to facilitate communication and interoperability among digital devices present inside or within the close vicinity of a home.
Information Technology Program Management Office	IT PMO	An IT department that is responsible for delivery of IT projects. The department is comprised of project managers and specialists that are involved with project governance, concept document and business case development, project delivery and budget and status reporting.
Institute of Electrical and Electronics Engineers	IEEE	An international professional association responsible for publications, conferences, technology standards, and professional and educational activities.

Intelligent Electronic Device	IED	A term used to describe microprocessor-based controllers of power system equipment, such as circuit breakers, transformers and capacitor banks.
Intrusion Detection System/ Intrusion Prevention System	IDS/IPS	Network security appliances that monitor network and/or system activities for malicious activity. The main functions of intrusion prevention systems are to identify malicious activity, log information about this activity, attempt to detect/block/stop it, and report it
Joint Security Operations Center	JSOC	An integrated operational function that combines cybersecurity and physical security professionals who together provide around-the-clock security monitoring and analysis of both cybersecurity and physical security events.
Key Risk Indicators	KRI	Used to measure where specific cybersecurity risks may be present and provide management with the information necessary to implement compensating controls, take remediation actions, or accept risk.
Network Anomaly Detection	NAD	Network anomaly detection is an approach to network security threat detection that is based on continuous monitoring of a network for unusual events or trends.
North American Electric Reliability Corporation Critical Infrastructure Protection	NERC CIP	Committee formed to help NERC advance the physical security and cybersecurity of the critical electricity infrastructure of North America.
Operating System	OS	Software that manages computer hardware resources and provides common services for other computer programs. The operating system is an essential component of the system software in a computer system.
Personally Identifiable Information	PII	Information that can be used on its own or with other information to identify, contact, or locate a single person, or to identify an individual in context.
Remote Terminal Unit	RTU	Electronic device that interfaces objects in the physical world to a distributed control system or SCADA system by transmitting telemetry data to a master system, and by using messages from the master supervisory system to control connected objects.
Request For Proposal	RFP	A Supply Management process used to enable potential suppliers to submit business proposals to SDG&E for the procurement of a commodity, service or asset.

San Diego Gas & Electric Company	SDG&E	An investor-owned, Sempra Energy utility.
Sarbanes-Oxley Act Section 404	SOX	An act passed by U.S. Congress in 2002 to protect investors from the possibility of fraudulent accounting activities by corporations. Mandated strict reforms to improve financial disclosures from corporations and prevent accounting fraud.
Security Operations Center	SOC	A functional capability of the Information Security Program that provides performs around-the-clock security monitoring and analysis of security events.
Sempra Energy Utilities	SEu	SDG&E and SoCalGas, collectively.
Smart Pricing Program	SPP	An SDG&E business initiative that is implementing business process and technology changes to existing internal IT systems, such as CISCO, CRM and MyAccount in order to support time of use pricing programs for residential and commercial customers.
Southern California Gas Company	SoCalGas	An investor-owned, Sempra Energy utility.
Supervisory Control and Data Acquisition	SCADA	Type of industrial control system ("ICS"). Industrial control systems are computer-based systems that monitor and control industrial processes that exist in the physical world.
SysAdmin, Audit, Networking, and Security	SANS	The SANS Institute is a private U.S. company that specializes in information security and cyber security training.
System Average Interruption Duration Index	SAIDI	The System Average Interruption Duration Index is used to measure the duration of outages and is one of four key performance indicators used to measure the reliability performance of the SDG&E electric distribution system.
Systems Applications and Products	SAP	Developers of enterprise software and software-related services. Headquartered in Walldorf, Germany, with locations in more than 130 countries.
Unix	---	A multitasking, multiuser computer operating system.
Wide Area Network	WAN	A type of network that covers a broad area (i.e., any telecommunications network that links across metropolitan, regional, national or international boundaries) using leased telecommunication lines.