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

SDG&E

DIRECT TESTIMONY OF CARL LAPETER

(ELECTRIC GENERATION)

November 2014

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

SDGE
A Sempra Energy utility®

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SUMMARY

ELECTRIC GENERATION			
Shown in Thousands of 2013 Dollars	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
Total Non-Shared	42,161	53,471	11,310
Total Shared Services (Incurred)	702	944	242
Total O&M	**42,863**	**54,415**	**11,552**

NEW GENERATION			
Shown in Thousands of 2013 Dollars	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
Total CAPITAL	**21,736**	**8,408**	**8,347**

Summary of Requests

- Newly represented in this GRC cycle are the Desert Star Energy Center and Cuyamaca Peak Energy Plant
- All the Generation Plants are expected to have run profiles consistent with 2013, adjusted for 2014 Major outages at Palomar Energy Center and Desert Star Energy Center
- The Palomar Energy Center will terminate the Long Term Service Agreement in 2014
- Capital projects sponsored herein are intended to increase the overall reliability of the plants

This testimony addresses our key Generation challenges:

- Maintaining high reliability and availability with an aging generation fleet
- Changes in the regulatory environment are evolving and expanding rapidly
- Managing the composition of the workforce to accommodate renewables and non-traditional technologies, training needs and planning for turnover of the aging workforce

SDG&E DIRECT TESTIMONY OF CARL LAPETER
(ELECTRIC GENERATION)

I. INTRODUCTION

A. Summary of Costs

I sponsor the Test Year 2016 forecasts for operations and maintenance (O&M) costs for both non-shared and shared services, and capital costs for the forecast years 2014 and 2015 and test year 2016, associated with the Electric Generation function for SDG&E. Table 1 summarizes my sponsored costs.

TABLE 1

Test Year 2016 Summary of Total Costs

ELECTRIC GENERATION			
Shown in Thousands of 2013 Dollars	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
Total Non-Shared	42,161	53,471	11,310
Total Shared Services (Incurred)	702	944	242
Total O&M	**42,863**	**54,415**	**11,552**

NEW GENERATION			
Shown in Thousands of 2013 Dollars	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
Total CAPITAL	**21,736**	**8,408**	**8,347**

In addition to this testimony, please also refer to my workpapers, Ex. SDG&E-11-WP (for O&M) and SDG&E-11-CWP (for capital) for additional information on the activities described herein.

B. Summary of Activities

The Electric Generation testimony encompasses three primary areas: Generation Plant, Resource Planning and Administration.

1. Generation Plant

Generation Plant represents more than 90% of the O&M and capital expenditures in the Electric Generation organization. SDG&E owns and operates two combined Cycle generating facilities, Palomar Energy Center, located in Escondido, CA, and Desert Star Energy Center, located in Boulder City, NV. SDG&E also owns and operates two peaking plants, Miramar

Energy Facility, located in San Diego, CA, and Cuyamaca Peak Energy Plant, located in El Cajon, CA. Together the plants are capable of providing power to approximately 750,000 homes in the region.

Figure 1: SDG&E Generating Facilities

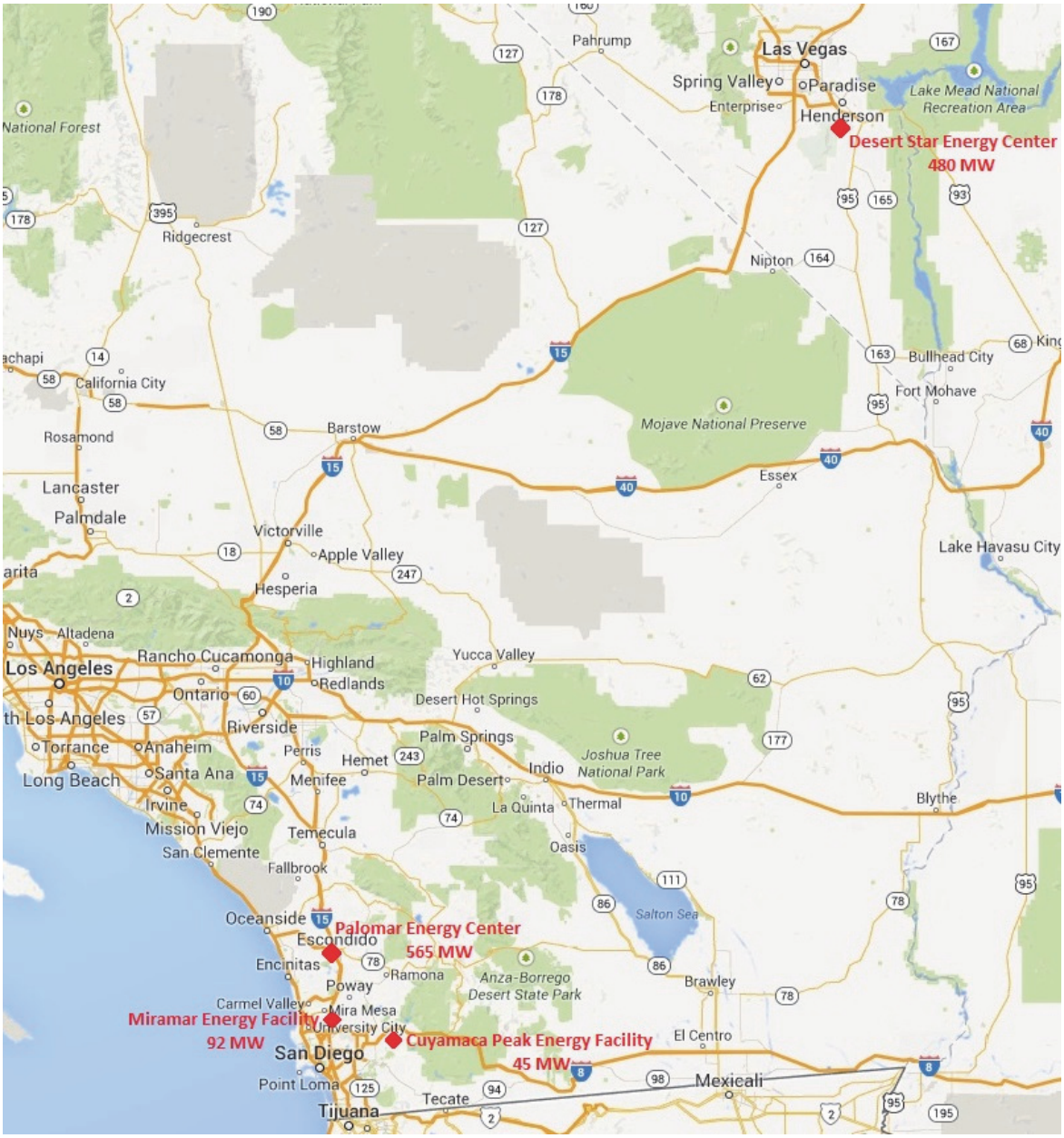


Figure 1 is a map of the SDG&E generating facilities and MW capability

The following sections discuss these plants in greater detail.

a. Palomar Energy Center

Palomar Energy Center (PEC) consists of two General Electric Frame 7FA combustion turbine-generator sets (CT) and a single steam turbine-generator set (ST). Each CT exhausts into a heat recovery steam generator (HRSG), each of which is equipped with a selective catalytic reduction system (SCR) for removal of nitrogen oxide (NOx) and an oxidation catalyst for removal carbon monoxide (CO). Each HRSG is also equipped with a duct burner system to provide additional heat for steam production during peak load periods. The steam produced in the two HRSG's is supplied to the single ST. Exhaust steam exiting the ST is condensed in a steam surface condenser by transferring heat to circulating cooling water. Heat in the circulating cooling water is then rejected to the atmosphere in an evaporating cooling tower.

The full-load continuous rating of the PEC facility at design conditions is 565 MW. PEC is also configured so that it may operate only one combustion turbine and the steam turbine. This gives PEC the operational flexibility to respond to varying load demands while maximizing operational efficiency. This plant configuration is commonly referred to as a combined cycle plant and is a typical design for modern high-efficiency generating plants in use by utilities and independent power producers throughout the world.

Combined cycle power plants are capable of producing more power and are more efficient at colder ambient temperatures. To take advantage of this fact, PEC is equipped with a chiller system that cools the air inlet temperature to the combustion turbines to approximately 50 degrees Fahrenheit. This system allows the plant to increase output on hot summer days when the system electrical demand is highest, with no additional air emissions.

b. Desert Star Energy Center

Pursuant to D.07-11-046[1], SDG&E assumed ownership and operational control of El Dorado Energy, located in Boulder City, NV, in October of 2011. The facility was subsequently renamed Desert Star Energy Center (DSEC).

DSEC consists of two Westinghouse (Siemens) 501-FC+ combustion turbine-generator sets (CT) and a single Westinghouse steam turbine-generator set (ST). Each CT exhausts into a

1 D.07-11-046, permitting SDG&E to exercise its option to purchase the 480 megawatt (MW) combined cycle power plant in Boulder City, Nevada, from El Dorado Energy, LLC. SDG&E assumed ownership of the El Dorado power plant in October 2011.

heat recovery steam generator (HRSG), each of which is equipped with a selective catalytic reduction system (SCR) for removal of nitrogen oxide (NOx) and an oxidation catalyst for removal carbon monoxide (CO). Each HRSG is also equipped with a duct burner system to provide additional heat for steam production during peak load periods. The steam produced in the two HRSG's is supplied to the single ST. Exhaust steam exiting the ST is condensed in a steam surface condenser by rejecting heat to the atmosphere via an air-cooled condenser.

The full-load continuous rating of DSEC at design conditions is 480 MW. DSEC is also configured so that it may operate only one combustion turbine and the steam turbine. This gives DSEC the operational flexibility to respond to varying load demands while maximizing operational efficiency.

c. Miramar Energy Facility

Miramar Energy Facility (MEF) consists of two General Electric LM 6000 combustion turbine-generator sets in a simple cycle configuration. MEF is used for peaking duty and is capable of generating 92 MW's. The facility uses modern peaking turbines with selective catalytic reduction (SCR) for nitrogen oxide (NOx) reduction and an oxidation catalyst for removal carbon monoxide (CO). The MEF combustion turbines can be operated locally or remotely from PEC, and are operated and maintained by the PEC staff.

d. Cuyamaca Peak Energy Plant

Pursuant to D.11-12-002, SDG&E assumed ownership and operational control of the Cal Peak peaking plant, located in El Cajon, CA, in January of 2012. The facility was subsequently renamed Cuyamaca Peak Energy Plant (CPEP).

CPEP consists of two Pratt & Whitney FT8 combustion turbines driving a single Brush generator set in a simple cycle configuration. This design is designated by the manufacturer as a Swift Pac. CPEP is used for peaking duty and is capable of generating 45 MW's. The facility uses modern peaking turbines with selective catalytic reduction (SCR) for nitrogen oxide (NOx) reduction and an oxidation catalyst for removal of carbon monoxide (CO). The CPEP combustion turbines can be operated locally or remotely from PEC, and are operated and maintained by the PEC staff.

e. Non-Gas Fired Utility Owned Generation

The Sustainable Communities program was created in 2004 to advance and promote green buildings, energy efficiency, and clean generation technologies in SDG&E's service territory. Through this effort 41 clean energy projects owned by SDG&E with technologies totaling 4.2 MW have been installed. One final project is currently under construction. Technologies employed include solar Photovoltaic (PV), fuel cells, and battery storage. These projects are sited at municipal, school, non-profit and commercial customer sites and help promote sustainable practices. The projects have also been used to help SDG&E better understand and prepare for the integration of local, clean energy sources with the Grid. SDG&E provides a payment to the building owner for their physical space and is responsible for the operation and maintenance of these systems. PV system maintenance consists of a full inspection and testing of each system to ensure safety and reliability of the installation and the customer facility. The fuel cell system has its own schedule of maintenance requirements which are more frequent. All sites are monitored to detect problems which may need immediate attention. O&M has covered lease payments to the customer and module washing when needed. All systems were covered and warranted under an initial contract with the contractor/manufacturer, and includes scheduled annual preventative maintenance. These contracts/system warranties are beginning to expire, however, necessitating an addition to SDG&E's costs to maintain these systems.

The Solar Energy Project is currently in the design/permitting process. When completed, this effort is expected to result in solar PV systems totaling 8.6 MW at three different locations. All sites will be ground mount, fixed tilt systems located in San Diego County, on utility property, and sited near distribution substations. An agreement has been drawn up with the design-build contractor to provide maintenance and performance guarantees for these systems. This agreement will be triggered upon system commissioning. O&M tasks include full physical system inspections, electrical and infrared testing, inverter maintenance, data acquisition test and recalibration, and providing full documentation. The system will be continuously monitored by the contractor and SDG&E. The contractor will be responsible for performance testing and annual performance goals. Each site will also require maintenance for landscape, irrigation system, weed control, defensible space, access road, dust mitigation, module washing, and communication and control.

2. Resource Planning

Resource Planning is responsible for planning the long-term electric generation needs of SDG&E's bundled customers, as well as planning for adequate resources to meet local capacity requirements of all customers. Having a reliable electric supply to serve the needs of customers is critical to the utility providing reliable power at the lowest possible cost.

The major work product of this department include the Long Term Procurement Plan (LTPP) which is a reoccurring two year CPUC proceeding that integrates all of SDG&E's activities in carrying out the CPUC's preferred loading order for resource additions. This includes integrating areas like energy efficiency, demand response, Renewable Portfolio Standards (RPS), energy storage, and conventional resources into a single plan. This plan not only looks at the needs of bundled customers but also looks to ensure that adequate total resources exist to meet the reliability needs of all customers, including Direct Access customers. Resource Planning is also responsible for evaluating specific resource acquisitions in the Procurement department's Request for Offers. This work includes the evaluation of each option and how it fits within SDG&E's existing portfolio.

In addition, the department produces the Energy Resource Recovery Account (ERRA) forecast. There has been a substantial increase in the manpower needed to develop and manage this for the commission's forecasting and compliance proceedings. Likewise, the department's activities have increased due to its participation in CPUC and California Air Resource Board (CARB) proceedings related to Green House Gas (GHG) and providing the forecasts of GHG associated with the bundled customer's resource portfolio. Finally, this department also works with the California Energy Commission (CEC) on policy issues impacting California and participates in such activities as the Integrated Energy Policy Report. Resource Planning produces the capacity, energy and commodity cost forecasts for this annual proceeding.

In addition, the department also provides oversight of San Onofre Nuclear Generating Station (SONGS) operating and decommissioning activities. With the SONGS shutdown, SDG&E oversight will continue and will shift from performance monitoring of an operating plant to oversight of a de-construction project as a minority owner.

3. Administration

Administration covers a broad base of activities at multiple levels of the organization.

a. Senior Vice President (SVP) Power Supply

The SVP Power Supply provides direction and managerial oversight of the entire Power Supply organization, of which Generation and Resource Planning are a part. Other areas of the Power Supply organization including Electric and Fuel Procurement, Smart Grid, Transmission Planning, and Major Projects Outreach which are not part of this testimony.

b. Vice President (VP) Generation and Resource Planning

The VP Generation and Resource Planning provides direction and managerial oversight for Generation and Resource Planning, Smart Grid Projects and Distribution Planning. This testimony will only address Generation and Resource Planning.

c. Generation Plant Administration

Generation Plant Administration provides managerial oversight and analytical support for the generating fleet.

4. Challenges Facing Operations

The key challenges facing Generation and Resource Planning during the next decade include the following:

- Maintaining high reliability and availability with an aging generating fleet.

  As equipment ages it becomes increasingly important to invest time and money to ensure that equipment is kept up to date and that the latest innovations in maintenance practices are employed. Current industry best practice predictive maintenance techniques, such as Transformer Condition Monitoring, Vibration Monitoring for rotating machinery and steam system weld inspections, are used to reduce unplanned failures.

- The regulatory environment is evolving and expanding rapidly.

  Some of the new regulations such as those related to system security are being continuously updated and revised and could require extensive modifications to be made to affected generating facilities.

- By 2016 26% of the technical staff (operations and maintenance) will be retirement eligible.

An adequate response to this situation must occur over many years. SDG&E has a robust engineering intern program to help entice the next generation in the electric utility business. In addition, the composition of the utility workforce is changing as the nature of the business evolves. Much emphasis is being put on smart grids and generation with renewable fuels. This will require future workers to have different skill sets and educational backgrounds. The military, particularly, the Navy, has been an excellent source of technicians with the skills to operate fossil generation stations but as the industry moves into renewables and non-traditional technologies those skill sets need to be adapted to new technology, which requires additional training.

- Ensure reliable supply of power while considering the resource mix.

  The Resource Planning department is responsible for assessing how to meet the changing power needs of SDG&E's customers while complying with state policies established to minimize impacts to the environment. The department's challenge is to ensure a reliable supply of power while considering the changing resource mix driven by the state's resource loading order. The growth in both behind the meter resources, mainly rooftop solar, and supply side resources to meet a 33% RPS is adding additional complexity to the planning system. This resource mix is creating a need to analyze the system in ways previously not required, such as assessing the need for "flexible" resources. Additionally, the sheer number of resources is growing as more, smaller plants are added to SDG&E's portfolio. All of these considerations are requiring the development of whole new planning models and techniques previously not required and creating additional complexity and manpower needs.

C. Supports SDG&E's Goals

My cost forecasts support the goals set forth in the policy testimony of Mr. Steve Davis (Ex. SDG&E-01), by planning for and providing reliable and efficient power to the region now and for years to come.

D. Safety/Risk Considerations

1. Overview of Electric Operations Risk Management - SDG&E

SDG&E has in place a well-structured and documented approach to risk management. Risks confronted by the generation business can generally fall into one of the following areas: safety; system reliability; physical security; natural disaster; and failure of disaster recovery. Given the nature of the generation business and power plants, employee and public safety are an ongoing concern and focus area. System reliability risks may include: unexpected damage to generating equipment, which may affect plant rating or failure of redundant or other equipment, which has myriad possible consequences, including loss of power, unit shutdown, or reduced power. Physical security risks, such as vandalism, theft, sabotage and terrorism, may affect employee safety and plant reliability and result in costly recovery and time off-line for SDG&E's generating plants. Risks associated with natural disasters that may affect generating plants include wildfire and earthquakes. Where wildfires encroach upon or approach power plant property, heat or flames may detrimentally affect the integrity of storage tanks or gas cylinders and smoke may cause fouling of turbine inlet combustion air filters, resulting in reduced power operations or shutdown. Disaster recovery risks confronted by Generation are generally traceable to unavailability of third party (vendor or contractor) support or equipment, which may prolong plant disruptions. As the varied and significant risks highlighted above illustrate, as SDG&E's generation business has become more complex, the safety and security risks associated with operating its systems have grown, requiring an evolution in the Company's approach to managing risks.

In light of the risks identified above, mitigation efforts implemented at SDG&E's generating plants includes the following:

- Implementation of safety and technical training;
- Use of safety department reviews, inspections, and audits;
- Use of system warning alarms to prevent unsafe conditions or dangerous conditions;
- Implementation of industry best practice operating programs and procedures, including reliability centered maintenance program and procedures;
- Performance of predictive maintenance to minimize unexpected equipment failures;

- Installation of modern control systems to ensure equipment is operated within design;
- Use of data collection and trending analysis to identify plant problems in advance of failures;
- Conduct of periodic plant inspections by insurance consultants;
- Controlling access to all power plants, plant operations buildings and plant control areas through a card reader system;
- Installation and monitoring of activity through a security camera system at all plants. PEC, MEF, and CPEP are monitored by a 24-hour per day guard;
- Implementation of a cyber-security program;
- Installation of onsite fire detection and protection systems;
- Use of an SDG&E industrial fire brigade, supported by a corporate contract with Capstone Fire Management and managed by SDG&E's Fire Program Manager. Capstone personnel are trained in a variety of fire suppressions fields, with specific training related to oil fires (transformers, circuit breakers, lube oil, etc.), and, when requested, will provide onsite fire suppression units and equipment; and
- Building structures appropriately rated to withstand earthquakes and reinforcing those built in the past.

II. NON-SHARED COSTS

A. Introduction

Following are the forecasted expenses for the non-shared O&M Electric Generation organizations. The historical expenses have been adjusted to more accurately reflect the actual operations of each group with the organization. Forecasted expenses have also been adjusted for various items that will affect the future expenditures of each organization within the group. Table 2 summarizes the total non-shared O&M forecasts for the listed cost categories.

TABLE 2

Non-Shared O&M Summary of Costs

ELECTRIC GENERATION			
Shown in Thousands of 2013 Dollars			
Categories of Management	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
A. Generation - Plant	40,697	50,829	10,132
B. Resource Planning	426	1,261	835
C. Administration	1,038	1,381	343
Total	**42,161**	**53,471**	**11,310**

B. Generation Plant

1. Description of Maintenance Outage

Planned maintenance outage work scope varies from year to year, based on required maintenance activities and equipment condition. Some examples are:

- CT hot section parts need to be replaced when the designated operating hours are met. The design operating hours are determined by the manufacturer.
- Boiler inspections (HRSG inspections) are required approximately annually in accordance with the State Boiler Code.
- CT borescope inspections are performed annually in accordance with manufacturer's recommendation.
- Various steam piping welds are inspected in accordance with good industry and maintenance practices.

- Electrical switchgear is inspected in accordance with industry practices. Some electrical and protective relay testing is performed in accordance with industry regulations.

Note: This is a small sample, not intended to describe all outage work. Outage work may be done to meet, manufacturer's requirements or recommendations, accepted industry practices, regulatory requirements, or as a good maintenance practice. The goal is to maintain the power plant for safe and reliable operation.

In general, planned outages can be designated in three categories, as follows:

- Annual Outage – The power plant is shutdown to allow inspection and repairs for electrical, mechanical and controls equipment.
- Minor Outage – The power plant is shutdown to allow replacement of CT internal hot section parts (as prescribed by the OEM), and for work that is performed in an Annual Outage.
- Major Outage – The power plant is shutdown to allow the ST (turbine and generator) to be disassembled, inspected, repaired and reassembled, and also the work performed in the Minor Outage. The CT and ST generators are also disassemble, inspected, repaired and reassembled.

Note: The outage work is much more extensive than described above. These brief definitions are provided to show the major conceptual differences in the outages.

TABLE 3

Generation – Plant Summary of Costs

ELECTRIC GENERATION			
Shown in Thousands of 2013 Dollars			
A. Generation - Plant	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. Generation Plant Palomar	17,554	22,788	5,234
2. Generation Plant Desert Star	18,706	24,641	5,935
3. Generation Plant Miramar	3,379	2,264	-1,115
4. Generation Plant Cuyamaca Peak	1,058	1,136	78
Total	**40,697**	**50,829**	**10,132**

2. Generation Plant Palomar

a. Description of Costs and Underlying Activities

The O&M request for Generation Plant Palomar includes labor and non-labor costs. The labor component includes salaries for supervision, support staff, maintenance and operations personnel. The non-labor component includes, but is not limited to, industrial gases, chemicals, water, parts, outside services, and maintenance activities.

b. Supports Company Goals

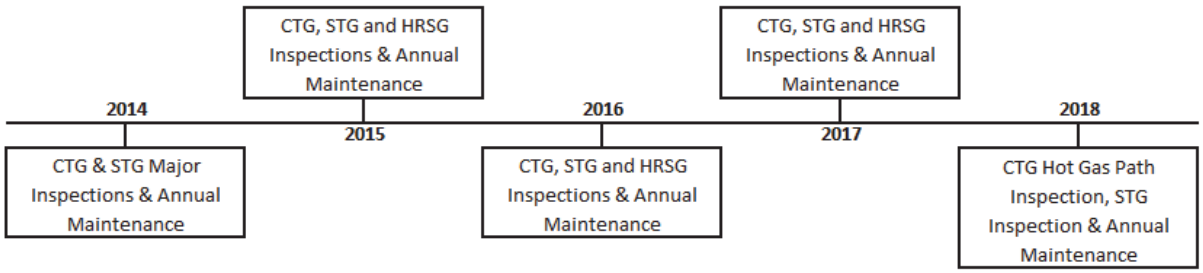
The PEC maintenance program supports the company's goals of safety and reliable system operation. The maintenance program is based on reliability centered maintenance practices, designed to ensure the safe, reliable operation of the facility over its lifetime. Maintenance activities are designed and scheduled based on a variety of factors including manufacturer recommendations, operating history, predictive techniques, past experience, subject matter expert input, and industry best practice.

c. Forecast Method

The forecasting method selected for Generation Plant Palomar labor is the 3-year average. In 2012 the operations staff was increased by 3 employees. Utilizing the 3-year average method most accurately reflects that change, the current staffing levels and the future needs of the organization. The forecasting method selected for non-labor is the 5-year average. This method was selected because it includes a variety of planned (typical annual maintenance outages) and unplanned maintenance events (repairs for ST nozzles, blades and valve damage) and provides a longer history of recorded spending than the 3 and 4 year averages. Selecting any of the linear trending or the 3 year average would result in an overstated request.

d. Cost Driver

Maintenance outages are a major portion of the O&M request for Generation Plant Palomar. Maintenance outages are scheduled annually, with the extent of the maintenance dependent upon the accumulated run hours on the equipment and the number of turbine starts. The below table shows the projection for the planned maintenance outages for PEC, subject to change based on actual accumulated hours:



PEC conducted a Major inspection and maintenance in February of 2014 and is on track to perform a minor inspection and maintenance in the spring of 2018. The 2014 Major inspection was originally scheduled for the end of 2012. However, due to unplanned maintenance outage periods and collaboration with the manufacturer regarding service life of the rotating parts, the Major outage was rescheduled. Routine inspections and maintenance of the Palomar equipment occur daily as part of the plant operating staff's normal activities. In addition to the daily inspections and maintenance the facility is scheduled for at least one maintenance outage per year. The purpose of the annual outage is to complete any maintenance activities that require the plant to be out of service. These types of activities typically consist of internal inspections for all major equipment, leak repairs, replacement of worn components, rotating equipment lubrication, adjustment of control valves, electrical maintenance, control system maintenance, system upgrades, and any other maintenance as recommended by the manufacturers or maintenance staff. The historical data includes expenses that are considered to be typical for a three-week maintenance outage. Since the next minor inspection is outside of this GRC period additional costs associated with this activity are being spread across the forecast years at a rate of 1/3 of the estimated additional expense per year. The additional outage expense per year is estimated to be $6.5M. That estimate is based on required maintenance intervals, estimated run hours, and the fact that Palomar combustion turbines will no longer be covered under a Long Term Service Agreement (LTSA) with the equipment manufacturer.

Palomar was purchased by SDG&E through a Turnkey Acquisition Agreement (TAA) between SDG&E and Palomar Energy, LLC, as approved by Commission in D.04-06-011. The TAA, as approved by the Commission, contained a provision to assign the LTSA to SDG&E. The LTSA was purchased through General Electric Corporation (GE), the manufacturer of the prime components (i.e., the combustion turbine system and steam turbine system) utilized in the

plant. The LTSA addressed planned maintenance costs and was calculated and payable according to a schedule contained in the agreement.

After completion of the 2014 Major inspection and maintenance at PEC, SDG&E will terminate the LTSA with GE. The termination will be in accordance with the "termination for convenience" provision in the LTSA. Effective June 30, 2014, SDG&E entered into an agreement with General Electric whereby as part of the LTSA termination SDG&E would procure components necessary for an Advanced Gas Path upgrade which will result in an improved plant output, to be held in inventory until installed. Installation is dependent on the outcome of a current proceeding before the California ISO (Q968 Palomar Energy Center 2 – Cluster Interconnection Study), San Diego Air Pollution Control District permit change, and California Energy Commission authorization. The agreement requires the components, valued at $30 million which is net of trade-in of older components currently in service, to be purchased in 2014. The purchase of the parts will be recorded in Materials & Supplies. (See the testimony of Mr. Jesse Aragon, SDGE-27, for treatment of Materials & Supplies). Termination of this agreement will allow SDG&E to establish a lower cost, more flexible turbine maintenance program. Payments previously made to GE under the LTSA covered items such as engineering support, remote equipment monitoring by GE's Monitoring and Diagnostic Center, major component refurbishment and replacement, replacement parts, labor for major and minor maintenance outages and inspections, as well as on-site administrative and technical support. These functions will now be performed by an on-site turbine maintenance coordinator and through the use of contracts with a variety of original equipment manufacturers (OEM) and third party service providers. The cost for the on-site turbine maintenance coordinator has been added to the forecast years. Much like with an LTSA in place, the major factors influencing the cost of the maintenance program are the number of unit starts, trips, and operating hours.

3. Generation Plant Desert Star

a. Description of Costs and Underlying Activities

The O&M request for Generation Plant Desert Star includes labor and non-labor costs. The labor component includes salaries for supervision, support staff, maintenance and operations personnel. The non-labor component includes, but is not limited to, industrial gases, chemicals, water, parts, outside services, and maintenance activities. The non-labor component also includes the payments for the Desert Star LTSA purchased through Siemens.

b. Supports Company Goals

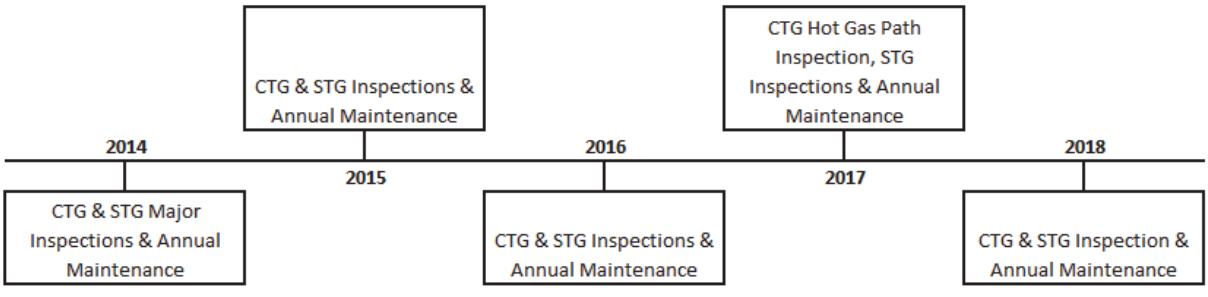
The DSEC maintenance program supports the company's goals of safety and reliable system operation. The maintenance program is based on reliability centered maintenance practices, designed to ensure the safe, reliable operation of the facility over its lifetime. Maintenance activities are designed and scheduled based on a variety of factors including manufacturer recommendations, operating history, predictive techniques, past experience, subject matter expert input, and industry best practice.

c. Forecast Method

Desert Star was brought into SDG&E in the 4th quarter of 2011. The actual spending in 2011 does not represent an entire year of spending. Therefore, the 3, 4 and 5 year averages and trends are not applicable. The forecasting method selected for Generation Plant Desert Star for labor and non-labor is the base year recorded methodology, with the exception of the LTSA which was forecasted using the zero-based methodology. The base year recorded method was selected for labor and non-labor because it provides a reasonable foundation from which to forecast future years spending. The base year includes an accurate staffing level, a typical annual maintenance outage, and typical plant operations. The LTSA was forecasted using the zero-based methodology, non-standard escalation, because it does not follow normal year-over-year escalation trending.

d. Cost Driver

Maintenance outages are a major portion of the O&M request for Generation Plant Desert Star. Maintenance outages are scheduled semi-annually, with the extent of the maintenance dependent upon the accumulated run hours on the equipment and the number of turbine starts. The below table shows the projection for the planned maintenance outages for DSEC, subject to change based on actual accumulated hours:



DSEC conducted Major inspections and maintenance in the spring and fall of 2014 and is on track to perform minor inspections in 2017. Routine inspections and maintenance of the DSEC equipment occur daily as part of the plant operating staff's normal activities. In addition to the daily inspections and maintenance the facility is scheduled for at least two maintenance outages per year. The purpose of the semi-annual outages is to complete any maintenance activities that require the plant to be out of service. These types of activities typically consist of internal inspections for all major equipment, leak repairs, replacement of worn components, rotating equipment lubrication, adjustment of control valves, electrical maintenance, control system maintenance, system upgrades, and any other maintenance as recommended by the manufacturers or maintenance staff. The base year data includes expenses that are considered to be typical for the two maintenance outages. Since the next minor inspection is outside of this GRC period additional costs associated with this activity are being spread across the forecast years at a rate of 1/3 of the estimated additional expense per year. The additional outage expense per year is estimated to be $1.3M.

Although the base year data provides a good foundation for forecasting the future expenditures of DSEC the data is missing approximately 2 months of operating expenses. In April of 2013, DSEC experienced a GSU transformer failure that required the plant to be out of service for an extended period. During that outage period the plant did not incur operating expenses or LTSA expenses as it normally would. These expenses have been estimated at $2.8M and have been included in the adjustment to the forecast years.

The other major component of the DSEC O&M request is the monthly LTSA payments. DSEC was acquired by SDG&E pursuant to D.07-11-046 in October of 2011. As part of that transaction the LTSA was reassigned from Sempra Generation to SDG&E. The LTSA addresses routine maintenance costs and is calculated and payable according to a schedule contained in the agreement. Major factors influencing the cost and payment schedule are the number of starts, trips and operating hours. Payments made to Siemens under the LTSA cover items such as parts purchase, parts refurbishment, field services, outage planning and engineering support.

In accordance with the agreement, the LTSA will very each year by the percent change in the U. S. Consumer Price Index (CPI) over the period from the base date. Since the CPI is historical in nature, escalation information for the calculation was derived from Global Insight (see the testimony of Mr. Scott Wilder for escalation information from Global Insight). Using

the escalation information indicates that the change will be 7.9% for 2014, 9.62% for 2015, and 11.55% for 2016 over the base value of the agreement. Another factor in forecasting for the LTSA is the projected CT run hours for the forecast years. The average CT service hours are projected to be 6,500 for 2014, 7,367 for 2015, and 7,388 for 2016. These factors will result in an overall increase in LTSA payments during the forecast years.

4. Generation Plant Miramar

a. Description of Costs and Underlying Activities

The O&M request for Generation Plant Miramar includes labor and non-labor costs. The labor component includes salaries for supervision, support staff, maintenance and operations personnel. The non-labor component includes, but is not limited to, industrial gases, chemicals, production of demineralized water, parts, outside services, and maintenance activities.

b. Supports Company Goals

The MEF maintenance program supports the company's goals of safety and reliable system operation. The maintenance program is based on reliability centered maintenance practices, designed to ensure the safe, reliable operation of the facility over its lifetime. Maintenance activities are designed and scheduled based on a variety of factors including manufacturer recommendations, operating history, predictive techniques, past experience, subject matter expert input, and industry best practice.

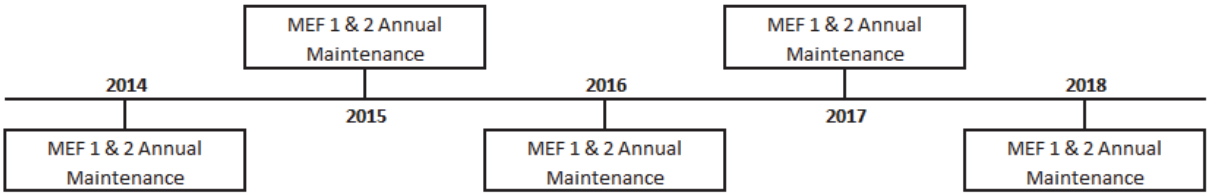
c. Forecast Method

The forecasting method selected for Generation Plant Miramar for labor and non-labor is the 4-year average. This method was selected because it includes a variety of planned (typical annual maintenance outages) and unplanned maintenance events (high pressure turbine repairs on Unit 1) and provides a longer history of recorded spending then the 3 year average. Selecting any of the linear trending methods or the 3 year average method would result in an over stated request. The second unit at Miramar went into commercial operation in August of 2009. Therefore, the 5-year average and trend are not applicable because the data only represents a partial year of operation of the second unit.

d. Cost Driver

Maintenance outages are a major portion of the O&M request for Generation Plant Miramar. Maintenance outages are scheduled annually, with the extent of the maintenance dependent upon the accumulated run hours on the equipment and the number of turbine starts.

The below table shows the projection for the planned maintenance outages for MEF, subject to change based on actual accumulated hours:



Major maintenance outages and inspections are scheduled based on cumulative operating hours and the number of start cycles. Since Miramar is a peaking plant and sees limited hours of operation per month, this facility is not expected to require any major maintenance outages for several years.

Routine inspections of the Miramar equipment occur as part of the operating staff's normal activities. In addition to routine inspections the facility is scheduled for at least one 2-week maintenance outage per year. The purpose of the annual outage is to complete any maintenance activities that require the plant to be out of service. These types of activities typically consist of internal inspections for all major equipment, leak repairs, replacement of worn components, rotating equipment lubrication, adjustment of control valves, electrical maintenance, control system maintenance, system upgrades, and any other maintenance as recommended by the manufacturers or maintenance staff. The historical data includes expenses that are considered to be typical for a two-week maintenance outage.

The forecast years have been adjusted for known issues and maintenance activities. Forecast year 2014 includes a onetime water and sewer capacity fee that was collected by the city as a result of an increase in demand for water and sewer flow at the facility. Forecast year 2015 includes an increase in maintenance expenses for forecasted repairs to the high pressure turbine of MEF Unit 2.

5. Generation Plant Cuyamaca Peak

a. Description of Costs and Underlying Activities

The O&M request for Generation Plant Cuyamaca Peak includes labor and non-labor costs. The labor component includes salaries for supervision, support staff, maintenance and operations personnel. The non-labor component includes, but is not limited to, industrial gases, chemicals, production of demineralized water, parts, outside services, and maintenance activities.

b. Supports Company Goals

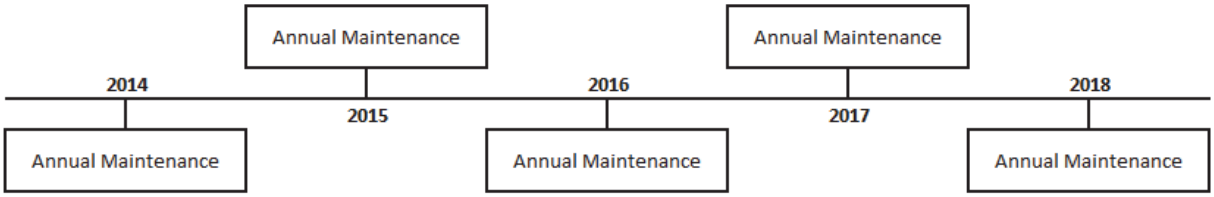
The Cuyamaca Peak maintenance program supports the company's goals of safety and reliable system operation. The maintenance program is based on reliability centered maintenance practices, designed to ensure the safe, reliable operation of the facility over its lifetime. Maintenance activities are designed and scheduled based on a variety of factors including manufacturer recommendations, operating history, predictive techniques, past experience, subject matter expert input, and industry best practice.

c. Forecast Method

Cuyamaca Peak was brought into SDG&E in the 1st quarter of 2012. Therefore, the 3, 4 and 5 year averages and trends are not applicable. The forecasting method selected for Generation Plant Cuyamaca Peak is the base year recorded methodology. The base year recorded method was selected for labor and non-labor because it provides a reasonable foundation from which to forecast future years spending. The base year includes an appropriate staffing level, a typical annual maintenance outage, and typical plant operations.

d. Cost Driver

Maintenance outages are a major portion of the O&M request for Generation Plant Cuyamaca Peak. Maintenance outages are scheduled annually, with the extent of the maintenance dependent upon the accumulated run hours on the equipment and the number of turbine starts. The below table shows the projection for the planned maintenance outages for CPEP, subject to change based on actual accumulated hours:



Major maintenance outages and inspections are scheduled based on cumulative operating hours and the number of start cycles. Since Cuyamaca Peak is a peaking plant and sees limited hours of operation per month, this facility is not expected to require any major maintenance outages for several years.

Routine inspections of the Cuyamaca Peak equipment occur as part of the operating staff's normal activities. In addition to routine inspections the facility is scheduled for at least one 2-week maintenance outage per year. The purpose of the annual outage is to complete any

maintenance activities that require the plant to be out of service. These types of activities typically consist of internal inspections for all major equipment, leak repairs, replacement of worn components, rotating equipment lubrication, adjustment of control valves, electrical maintenance, control system maintenance, system upgrades, and any other maintenance as recommended by the manufacturers or maintenance staff. The historical data includes expenses that are considered to be typical for a two-week maintenance outage.

In 2013 SDG&E agreed to a Preferred Service Agreement with PW Power Systems, Inc., for annual site audits, engineering support, training and software review related to the FT8 combustion turbine equipment. The term of the Agreement is three years with payments made quarterly. Only one quarterly payment was made in 2013. Therefore, the forecast years have been adjusted to include the additional three quarterly payments that will be made per year.

C. Resource Planning

TABLE 4

Resource Planning Summary of Costs

ELECTRIC GENERATION			
Shown in Thousands of 2013 Dollars			
B. Resource Planning	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. Resource Planning	426	1,261	835
Total	**426**	**1,261**	**835**

1. Description of Costs and Underlying Activities

The non-shared O&M request for Resource Planning includes labor and non-labor costs. The labor component includes salaries for supervision and support staff. The non-labor component includes, but is not limited to, operation, maintenance and lease costs for utility owned solar energy projects, contracted services related to SONGS decommissioning, and other miscellaneous administrative activities.

2. Supports Company Goals

The Resource Planning group supports the company's goal of delivering reliable power at the lowest possible cost. Resource Planning is responsible for planning the long-term electric generation needs of SDG&E's bundled customers, as well as planning for adequate resources to meet local capacity requirements of all customers.

3. Forecasting Method

Except for O&M for non-gas fired generation (which is explained below), forecasting for labor and non-labor are based on the 3-year average since the tasks and associated staffing needs remain unchanged. This method was selected because it represents a reasonable foundation for forecasting the future needs of the organization.

For the O&M costs for non-gas fired generation, the efforts for the Solar Energy Project are new while the Sustainable Communities efforts are being transferred from Electric Distribution. As part of the CPUC approval of the Solar Energy Project, D.10-06-016, specified that the "adopted O&M covers 2 FTE (10 FTE-yrs). These new FTEs will enable SDG&E to implement the Solar Energy Project and support other renewable development and procurement activities." It also approved O&M funding at $25/kW-yr escalated by CPI. By this present application, SDG&E seeks to re-affirm approvals for the Solar Energy Project and combine these O&M efforts with the legacy Sustainable Communities projects. For this, SDG&E seeks approval for one (1) FTE to oversee O&M activities. Sustainable Communities O&M was previously under the Electric Distribution, and as such, the full amount requested herein is partially offset by a reduction in Electric Distribution associated with lease, maintenance and repairs of the infrastructure. The forecast for Sustainable Communities was adjusted upward to reflect the expiration of warranties.

4. Cost Drivers

The primary cost drivers for Resource Planning are state policies and regulatory requirements. For the non-gas fired generation (SONGS and utility owned solar PV), costs are driven by requisite decommissioning requirements of SONGS and on-going O&M for the Solar Energy Projects and the Sustainable Communities PV Projects.

D. Administration

TABLE 5

Administration Summary of Costs

ELECTRIC GENERATION			
Shown in Thousands of 2013 Dollars			
C. Administration	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
1. SVP - Power Supply	664	658	-6
2. VP - Generation & Resource Planning	201	436	235
3. Generation Plant Administration	173	287	114
Total	**1,038**	**1,381**	**343**

1. SVP Power Supply

a. Description of Costs and Underlying Activities

The O&M request for SVP-Power Supply includes labor and non-labor costs. The labor component includes salaries for the SVP and administrative personnel. The non-labor component includes, but is not limited to, employee travel, supplies, consulting and other miscellaneous administrative activities.

b. Supports Company Goals

The SVP-Power Supply group supports the company's goal of delivering reliable power at the lowest possible cost.

c. Forecast Method

The forecasting method selected for SVP Power Supply for labor and non-labor is the 5-year average. Historically, this organization has experienced very little change as represented in the minor differences in the 3, 4 and 5 year averages. Utilizing the linear trending methodologies would result in an over stated request. The 5 year average method was selected because it provides a solid foundation of recorded spending over the longest period of time.

d. Cost Driver

The level of labor is expected to remain consistent throughout the forecast years. Non-labor has been adjusted to reflect the annual Clean Tech membership dues and additional administrative costs due to the reorganization of the Power Supply organization.

2. VP Generation & Resource Planning

a. Description of Costs and Underlying Activities

The O&M request for VP-Generation & Resource Planning includes labor and non-labor costs. The labor component includes salaries for the VP and business planning personnel. The non-labor component includes, but is not limited to, employee travel, supplies, consulting and other miscellaneous administrative activities.

b. Supports Company Goals

The VP-Generation and Resource Planning group supports the company's goal of safely delivering reliable power at the lowest possible cost. This is accomplished through the oversight of the company's power generating facilities and resource planning activities.

c. Forecast Method

The forecast methodology selected for VP Generation & Resource Planning for labor and non-labor are the zero-based methodology. This method was selected because this activity was created new in May of 2013. Therefore, the 3, 4 and 5 year averages and trends, and the base year methods are not applicable. The zero-based method will provide the most accurate forecast for the future needs of the organization.

d. Cost Driver

The forecast years have been adjusted to reflect the addition of one VP, one Business Analyst and the associated non-labor expenses.

3. Generation Plant Administration

a. Description of Costs and Underlying Activities

The O&M request for Generation Plant Administration includes labor and non-labor costs. The labor component includes salaries for the Director Electric Generation and business planning personnel. The non-labor component includes, but is not limited to, employee travel, supplies, consulting and other miscellaneous administrative activities.

b. Supports Company Goals

The Generation Plant Administration group supports the company's goal of safely delivering reliable power at the lowest possible cost. This is accomplished by providing administrative support and oversight for the generation group.

c. Forecast Method

The forecasting methodology selected for Generation Plant Administration for labor and non-labor is the 5-year average. In May of 2013 one of the two positions in this organization went vacant and was not filled for the remainder of the year. This vacancy negatively impacts the averages and linear trends. Therefore, the 5-year method was selected as it represents the most accurate spending at full staffing.

d. Cost Driver

The levels of labor and non-labor are expected to remain consistent throughout the forecast years.

III. SHARED COSTS

A. Introduction

Following are the forecasted expenses for the shared O&M Resource Planning organization. The historical expenses have been adjusted to more accurately reflect the actual operations of the group within the organization. Forecasted expenses have also been adjusted for various items that will affect the future expenditures of the organization within the group. The below table summarizes the total shared O&M forecasts for the listed cost categories.

TABLE 6

Shared O&M Summary of Costs

ELECTRIC GENERATION			
Shown in Thousands of 2013 Dollars	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
Total Non-Shared	42,161	53,471	11,310
Total Shared Services (Incurred)	702	944	242
Total O&M	**42,863**	**54,415**	**11,552**

I am sponsoring the forecasts on a total incurred basis, as well as the shared services allocation percentages related to those costs. Those percentages are presented in my shared

services workpapers, along with a description explaining the activities being allocated. See Ex. SDG&E-11-WP. The dollar amounts allocated to affiliates are presented in our Shared Services Policy and Procedures testimony. See Ex. SDG&E-26 (Diancin).

B. Resource Planning - Director

TABLE 7

Resource Planning – Director Summary of Costs

ELECTRIC GENERATION			
Shown in Thousands of 2013 Dollars Incurred Costs (100% Level)			
Categories of Management	**2013 Adjusted-Recorded**	**TY2016 Estimated**	**Change**
A. Resource Planning	702	944	242
Total Shared Services (Incurred)	**702**	**944**	**242**

1. Description of Costs and Underlying Activities

The Resource Planning-Director is responsible for providing over sight of the Resource Planning organization. The Resource Planning workforce utilizes a software package that enables them to model the electric system. These types of models are commonly referred to as production cost models. This model is used to develop CPUC required filings in proceedings including the LTTP, the ERRA and to forecast greenhouse gas emissions. Southern California Gas Company (SoCalGas) also uses a similar model to develop the demand for natural gas service from electric generators. A single contract has been negotiated with a vendor for both of these models. By having one contract, we are able to obtain these programs at a lower cost than by contracting for them separately. SDG&E is responsible for processing the contract payments. A portion of the expenses, equal to the programs utilized by SoCalGas, are allocated to SoCalGas.

2. Supports Company Goals

The Resource Planning - Director supports the company's goal of safely delivering reliable power at the lowest possible cost. This is accomplished through ensuring the availability of the tools required to evaluate resource needs and prudently maintaining existing infrastructure for utility owned non-gas fired generation.

3. Forecast Method

Forecasting for labor and non-labor are based on the 3-year average. This method was selected because it represents a reasonable foundation for forecasting the future needs of the organization.

4. Cost Drivers

The level of labor and non-labor spend for this is area is expected to remain consistent throughout the forecast years.

IV. CAPITAL

A. Introduction

Capital additions and improvements are continuous at all four Generation Plant facilities. All capital projects being considered increase the overall safety, reliability and operability of the plants. Capital projects of a minor nature are ongoing and will be selected and completed on an as needed basis. Table 8 summarizes the total capital forecasts for 2014, 2015, and 2016.

TABLE 8

Capital Expenditures Summary of Costs

NEW GENERATION			
Shown in Thousands of 2013 Dollars			
A. Generation Capital	**Estimated 2014**	**Estimated 2015**	**Estimated 2016**
1. Capital Tools & Test Equipment	471	471	471
2. Miramar Energy Facility	2,223	430	300
3. Palomar Energy Center	6,729	4,161	2,796
4. Desert Star Energy Center	10,885	1,734	4,480
5. Cuyamaca Peak Energy Plant	1,428	1,612	300
Total	**21,736**	**8,408**	**8,347**

In addition to this testimony, please also refer to my capital workpapers, Ex. SDG&E-11-CWP for additional information on the projects described herein.

B. Capital Tools & Test Equipment

1. Description

SDG&E plans to purchase tools and equipment that will enable plant personnel to work more efficiently and safely while maintaining plant equipment.

These forecasted capital expenditures support the company's goals of safe, reliable, low cost delivery of power.

2. Forecast Method

The forecasting methodology selected for this activity is the zero-based methodology. This method was selected because the tools and equipment purchased for the facilities are unique and non-repetitive. Using prior year expenses is not indicative of future spend and does not represent an effective tool for forecasting.

C. Miramar Plant Operational Enhancements

1. Description

SDG&E plans to build and place in service the below listed projects by the Test Year.

These forecasted capital expenditures support the company's goals of safe, reliable, low cost delivery of power.

2. Projects for 2014

MEF Mechanical Improvements $100,000

This project will be used to capture multiple small mechanical projects to be completed at Miramar Energy Facility. The projects are of a mechanical, structural, or civil nature and are intended to improve plant performance, or address operational, maintenance, safety or environmental issues.

For example: Upgrade the drain tank pump system by relocating the pump and modifying the pump controls and level monitoring instrumentation. This will provide for improved low level monitoring and pumping to ensure the tanks are kept dry minimizing the potential for mixed waste.

MEF Instrumentation Improvements $100,000

This project will be used to capture multiple small instrumentation projects to be completed at Miramar Energy Facility. The projects are intended to improve the monitoring devices at the plant by replacing outdated equipment or upgrading to better technology.

For example: Add real time current monitoring to the selective catalytic reduction (SCR) system to provide trending data for analysis and troubleshooting. This will enhance ability to diagnose problems and identify power quality issues.

MEF Turbine Controls Upgrade **$1,923,000**

Upgrade the current turbine control system and auxiliary control systems with an alternate control system, as well as upgrading existing HMI's (Human Machine Interface – specialized computer workstation for plant control) to HMI's with current operating systems and security software. This control system upgrade provides improvements to the following: system security, operator graphical and functional interface, ability to customize the operator interface, ability to make improvements to control functions, data collection and storage, trending and analysis, plant and system troubleshooting, and simplified network architecture.

MEF Electrical Improvements **$100,000**

This project will be used to capture multiple small electrical projects to be completed at Miramar Energy Facility. The projects will address improvements in control devices that provide power solutions for operation of the plant and modifications to existing electrical distribution systems to provide ease of access to power for welding, heat treating and other ancillary power needs.

For example: An additional protection device will be added to the generator circuit breaker control system that will prevent inadvertent closure of the circuit breaker due to a control system failure.

3. Projects for 2015

MEF Alternate Power Supply to ATS Project **$130,000**

This project will provide an alternate supply to each turbine generators essential electrical power system. The system upgrade is arranged in a manner to ensure that, during a blackstart situation, or certain maintenance activities, power is maintained to all site critical battery chargers. In addition this upgrade will maintain power to the Black Start Generator battery charger under various plant electrical configurations.

MEF Mechanical Improvements **$100,000**

This project will be used to capture multiple small mechanical projects to be completed at Miramar Energy Facility. The projects are of a mechanical, structural, or civil nature and are intended to improve plant performance, or address operational, maintenance, safety or environmental issues.

For example: See Projects for 2014.

MEF Instrumentation Improvements **$100,000**

This project will be used to capture multiple small instrumentation projects to be completed at Miramar Energy Facility. The projects are intended to improve the monitoring devices at the plant by replacing outdated equipment or upgrading to better technology.
For example: See Projects for 2014.

MEF Electrical Improvements **$100,000**

This project will be used to capture multiple small electrical projects to be completed at Miramar Energy Facility. The projects will address improvements in control devices that provide power solutions for operation of the plant and modifications to existing electrical distribution systems to provide ease of access to power for welding, heat treating and other ancillary power needs.
For example: See Projects for 2014.

4. Projects for 2016

MEF Mechanical Improvements **$100,000**

This project will be used to capture multiple small mechanical projects to be completed at Miramar Energy Facility. The projects are of a mechanical, structural, or civil nature and are intended to improve plant performance, or address operational, maintenance, safety or environmental issues.
For example: See Projects for 2014.

MEF Instrumentation Improvements **$100,000**

This project will be used to capture multiple small instrumentation projects to be completed at Miramar Energy Facility. The projects are intended to improve the monitoring devices at the plant by replacing outdated equipment or upgrading to better technology.
For example: See Projects for 2014.

MEF Electrical Improvements **$100,000**

This project will be used to capture multiple small electrical projects to be completed at Miramar Energy Facility. The projects will address improvements in control devices that provide power solutions for operation of the plant and modifications to existing electrical distribution systems to provide ease of access to power for welding, heat treating and other ancillary power needs.
For example: See Projects for 2014.

5. Forecast Method

The forecasting methodology selected for Miramar is the zero-based methodology. This method was selected because the projects selected for the facility are unique and non-repetitive. Using prior year expenses is not indicative of future spend and does not represent an effective tool for forecasting.

D. Palomar Plant Operational Enhancements

1. Description

SDG&E plans to build and place in service the below listed projects by the Test Year.

These forecasted capital expenditures support the company's goals of safe, reliable, low cost delivery of power.

2. Projects for 2014

PEC Steam Turbine Upgraded N2 Packing $312,000

Replace the N2 Case and Packing with a new design that is superior to the original design and will withstand the temperatures and pressures encountered with an acceptable lifetime.

PEC Steam Turbine Condenser Water Box Coating $100,000

Application of protective coating to the inside of the water box to minimize future required repairs due to corrosion. This will reduce potential plant outages due to a water leak, and help to avoid equipment degradation.

PEC Revenue Meter Upgrade $58,000

Installation of upgraded revenue meters that are of a style and brand that supports Ethernet communications, which has been demonstrated to be a more reliable method of data transfer.

PEC HP Bypass Quick Change Trim Upgrade $390,000

Upgrade the current steam by-pass valves to quick change trim. This upgrade will allow for easier maintenance during outage periods.

PEC LP Drum Level Control Valves LVDT's $51,000

Upgrade the control valve position sensing and controls to the latest technology using linear variable displacement transformer (LVDT). This type of sensor is more reliable, more accurate and more durable than the

original design. This technology has been installed on other drum level control valves at PEC with excellent results.

PEC Emerson Ovation HMI and Controller Upgrade $2,720,000

Upgrade the current turbine control system with an alternate control system, as well as upgrading existing HMI's to HMI's with current operating systems and security software. This control system upgrade provides improvements to the following: system security, operator graphical and functional interface, ability to customize the operator interface, ability to make improvements to control functions, data collection and storage, trending and analysis, plant and system troubleshooting, and simplified network architecture.

PEC HRH Desuperheater Upgrade $245,000

Replace the current hot reheat (HRH) steam desuperheater pipe assembly (with damaged internals) with an upgraded version with improved internal diffuser structural design. The new design provides greater durability for plant cycling operation.

PEC Hot Reheat Drain Pot Drains to Condenser Upgrade $138,000

Install a new HRH steam line condensate drain pot valve control and piping to reroute water away from the blow down tank and send it to the condenser. This will reduce visual pluming and increase water usage efficiency at the plant.

PEC Combustion Turbine Inlet Air Filter Upgrade $741,000

Replace the current combustion turbine inlet air filters with a new generation of high efficiency filters that are provide significantly better filtration to minimize fouling in the gas turbine.

PEC Remote Racking Devices $140,000

Installation of racking devices to allow for the remote disconnect of circuit breakers from switchgear. Installation of this equipment will ensure that plant personnel will be outside the potential arc flash boundary when racking a breaker in/out of service, providing an improvement to safety.

PEC Relocate Sample Panels to New Water Lab $590,000

Relocate the sample panels from their current location to the new water lab building and incorporate new sample coolers and chillers to improve the process and accuracy of the sample analysis results. This new location also improves maintenance access to the sample panels.

PEC Mechanical Improvements **$200,000**

This project will be used to capture multiple small mechanical projects to be completed at Palomar Energy Center. The projects are of a mechanical, structural, or civil nature and are intended to improve plant performance, or address operational, maintenance, safety or environmental issues.
For example: The cooling tower scale inhibitor pump skid was replaced with a new design that provides improved corrosion resistance, electronic pump speed adjustment for improved flow control and better availability of replacement parts.

PEC Instrumentation Improvements **$200,000**

This project will be used to capture multiple small instrumentation projects to be completed at Palomar Energy Center. The projects are intended to improve the monitoring devices at the plant by replacing outdated equipment or upgrading to better technology.
For Example: Add pressure transmitters to the Combustion Turbine Exhaust Frame Blowers discharge pipe. This will provide trending data for improved diagnostics and alarms to identify potential system problems.

PEC Electrical Improvements **$200,000**

This project will be used to capture multiple small electrical projects to be completed at Palomar Energy Center. The projects will address improvements in control devices that provide power solutions for operation of the plant and modifications to existing electrical distribution systems to provide ease of access to power for welding, heat treating and other ancillary power needs.
For example: A power transfer and isolation switch was installed on the plant Uninterruptable Power Supply system to allow for maintenance to be performed without shutting down the entire system.

PEC Exhaust Frame Flex Seal Upgrade **$158,000**

Replace the currently installed seals with Inconel 718 seals which have a better wear characteristic and higher yield strength at the temperatures that exist in the exhaust frame.

PEC Remote Emissions Monitoring Upgrade **$185,000**

Upgrade of the remote emissions monitoring system that will be used by the Ovation system to control turbine combustion dynamics and tuning.

PEC Site Security Improvements **$211,000**

This project will make improvements to the security system at Palomar Energy Center that will enhance the current system. Improvements will include installation of UV camera systems, window glass tamper systems, and additional HDVR recorders.

3. Projects for 2015

PEC GSU Bushing Seismic Upgrade **$1,535,000**

Replace the current generator step-up (GSU) transformer bushings at PEC with seismically rated bushings that are of the design and configuration to maximize reliability and life.

PEC Desuperheater Isolation Valves and Controls **$220,000**

Installation of additional isolation valves and pressure transmitters to prevent damage to the high energy pipes and boiler tubes, due to valve leakage.

PEC Mechanical Improvements **$200,000**

This project will be used to capture multiple small mechanical projects to be completed at Palomar Energy Center. The projects are of a mechanical, structural, or civil nature and are intended to improve plant performance, or address operational, maintenance, safety or environmental issues.
For example: See Projects for 2014.

PEC Instrumentation Improvements **$200,000**

This project will be used to capture multiple small instrumentation projects to be completed at Palomar Energy Center. The projects are intended to improve the monitoring devices at the plant by replacing outdated equipment or upgrading to better technology.
For example: See Projects for 2014.

PEC Electrical Improvements **$200,000**

This project will be used to capture multiple small electrical projects to be completed at Palomar Energy Center. The projects will address improvements in control devices that provide power solutions for operation of the plant and modifications to existing electrical distribution systems to provide ease of access to power for welding, heat treating and other ancillary power needs.
For example: See Projects for 2014.

PEC Chiller Triple Duty Valve Replacement **$105,000**

Replace existing triple duty valve, which is prone to leak-by problems, with two valves, to improve system line-up and isolation capability. One valve that will automatically open and close based on pump configuration, and the other will be used to isolate the pump and system for lockout tag out.

PEC Inlet Guide Vane & Gas Control Valve Upgrade **$553,000**

Upgrade the current hydraulic actuators that are used for gas valve and inlet guide cane controls to electric actuators. The electric actuator provides easier isolation for system lockouts.

PEC Upgrade Programmable Logic Controllers **$800,000**

Upgrade the programmable logic controllers (PLC) for the gas compressors, duct burners, water wash system and water purification system to Ovation controls. This control system upgrade provides improvements to the following: system security, operator graphical and functional interface, ability to customize the operator interface, ability to make improvements to control functions, data collection and storage, trending and analysis, plant and system troubleshooting, and simplified network architecture.

PEC Upgrade Chiller MKVIe to Ovation **$303,000**

Upgrade the chiller GE MKVIe control system to Ovation controls. This control system upgrade provides improvements to the following: system security, operator graphical and functional interface, ability to customize the operator interface, ability to make improvements to control functions, data collection and storage, trending and analysis, plant and system troubleshooting, and simplified network architecture.

4. Projects for 2016

PEC Mechanical Improvements **$200,000**

This project will be used to capture multiple small mechanical projects to be completed at Palomar Energy Center. The projects are of a mechanical, structural, or civil nature and are intended to improve plant performance, or address operational, maintenance, safety or environmental issues. For example: See Projects for 2014.

PEC Instrumentation Improvements **$200,000**

This project will be used to capture multiple small instrumentation projects to be completed at Palomar Energy Center. The projects are intended to improve the monitoring devices at the plant by replacing outdated equipment or upgrading to better technology.
For example: See Projects for 2014.

PEC Electrical Improvements **$200,000**

This project will be used to capture multiple small electrical projects to be completed at Palomar Energy Center. The projects will address improvements in control devices that provide power solutions for operation of the plant and modifications to existing electrical distribution systems to provide ease of access to power for welding, heat treating and other ancillary power needs.
For example: See Projects for 2014.

PEC Move All Air Lines Above Ground **$200,000**

The underground instrument air piping system will be abandoned in place and replaced with an above ground piping system. This will greatly improve reliability for the critical system by allowing piping to be visibly monitored for leaks and allowing for quick repair.

PEC Exciter Upgrade to Ovation **$845,000**

Upgrade the exciter controls to Ovation to allow for a consistent control system throughout the plant. This control system upgrade provides improvements to the following: system security, operator graphical and functional interface, ability to customize the operator interface, ability to make improvements to control functions, data collection and storage, trending and analysis, plant and system troubleshooting, and simplified network architecture.

PEC Load Commutator Inverter (LCI) Upgrade to Ovation **$575,000**

Upgrade the LCI controls to Ovation to allow for a consistent control system throughout the plant. This control system upgrade provides improvements to the following: system security, operator graphical and functional interface, ability to customize the operator interface, ability to make improvements to control functions, data collection and storage, trending and analysis, plant and system troubleshooting, simplified network architecture.

PEC Ovation Training and Testing Lab **$554,000**

Create an Ovation training and testing lab to provide the maintenance and operations staff with a simulator where they can learn plant startup and shutdown procedures and test alternate procedures, without affecting plant.

5. Forecast Method

The forecasting methodology selected for Palomar is the zero-based methodology. This method was selected because the projects selected for the facility are unique and non-repetitive. Using prior year expenses is not indicative of future spend and does not represent an effective tool for forecasting.

E. Desert Star Plant Operational Enhancements

1. Description

SDG&E plans to build and place in service the below listed projects by the Test Year.

These forecasted capital expenditures support the company's goals of safe, reliable, low cost delivery of power.

2. Projects for 2014

DSEC Spare 250MVA GSU Transformer **$3,911,000**

This transformer is designed as a spare for any of the GSU's at DSEC or PEC, thus eliminating the need to have multiple spares for specific applications. The spare will be stored at DSEC.

DSEC Steam Turbine L-0R Blades **$3,941,000**

These turbine blades will be taken out of inventory at DSEC and placed in the steam turbine during the 2014 major inspection. The improved blades will eliminate a known cracking issue with the existing blades and also remove the current operating limitations (avoidance zone) associated with the existing blades.

DSEC Upgrade Vibration Monitoring System **$441,000**

The current Bently 3300 system is obsolete and difficult to maintain. The upgrade to the Bently 3500 will improve the machinery vibration monitoring capabilities by replacing outdated equipment and upgrading to better technology. Vibration monitoring is used as part of a predictive maintenance and machinery reliability process.

DSEC Ammonia Dilution Blower Upgrade **$161,000**

The current dilution blowers are 13 years old and made of carbon steel, which are subject to internal corrosion and difficult to maintain. The new blowers are made of stainless steel which will eliminate the internal corrosion. Also, the new blower has an improved heavy duty bearing design providing longer life and better reliability.

DSEC HP Start-Up Vent Valves Upgrade **$624,000**

The current valves are leaking, which wastes purified water. The valves are thirteen years old and in need of costly repair. The replacement valves are an improved design that is not prone to leakage and provides for easier maintenance.

DSEC SCE Interconnection Upgrades **$212,000**

This project will be used to capture DSEC's portion of SCE's capital expenditures for the miscellaneous upgrades to the SCE Eldorado substation, as per section 9.7 of the EDE (DSEC)/SCE Eldorado Substation Additional Facilities and Interconnection Agreement.

DSEC CT#2 Inlet Filter Media Upgrade **$182,000**

The DSEC CT #2 inlet air filters and evaporative cooling media will be replaced with upgraded components. The new design provides an improved prefilter mounting solution to reduce the labor necessary to perform filter changes.

DSEC HRSG Penetration Seal Upgrade **$294,000**

The current Heat Recovery Steam Generator (HRSG) penetrations seals with a history of leaking and often require maintenance. This is a safety issue as well as a maintenance problem. The upgraded design provides greater longevity and less costly upkeep.

DSEC Desuperheater Upgrade **$161,000**

Steam system desuperheaters (High Pressure Exhaust Vent, Steam Jet Air Ejector, Gland Seal, and Condenser Hood Spray)are currently a welded design. These desuperheaters will be upgraded to a bolted flange design that will allow easier removal for required maintenance on this critical equipment.

DSEC CT1 Air Inlet Personnel Access Improvement **$150,000**

Install access doors, ladders, and platforms at each level of the CT1 Air Inlet. The improved access reduces the chance that an occupant could become trapped in an emergency and reduce the time and labor required to perform filter and media replacement.

DSEC Mechanical Improvements **$212,000**

This project will be used to capture multiple small mechanical projects to be completed at Desert Star Energy Center. The projects are of a mechanical, structural, or civil nature and are intended to improve plant performance, or address operational, maintenance, safety or environmental issues.

For example: Service water piping and low pressure piping material upgrade in order to provide longer service life.

DSEC Instrumentation Improvements **$212,000**

This project will be used to capture multiple small instrumentation projects to be completed at Desert Star Energy Center. The projects are intended to improve the monitoring devices at the plant by replacing outdated equipment or upgrading to better technology.

For example: Adding differential pressure instrumentation to various stages of the HRSG in order to more accurately predict fouling, and schedule maintenance.

DSEC Electrical Improvements **$212,000**

This project will be used to capture multiple small Electrical projects to be completed at Desert Star Energy Center. The projects are intended to improve the Electrical devices at the plant by replacing outdated equipment or upgrading to better technology.

For example: Upgrading components of the plant low and medium voltage systems to create a more reliable electrical service to plant equipment, including upgrading starters for our air cooled condenser fans, and installing new 480V receptacles and power distribution panels.

DSEC Valve Motor Operator Upgrade **$127,000**

Upgrade the aging valve motor operators throughout the plant to valves with new technology. The new design provides greater reliability.

3. Projects for 2015

DSEC Mechanical Improvements **$212,000**

This project will be used to capture multiple small mechanical projects to be completed at Desert Star Energy Center. The projects are of a mechanical, structural, or civil nature and are intended to improve plant performance, or address operational, maintenance, safety or environmental issues.

For example: See Projects for 2014.

DESC Instrumentation Improvements **$212,000**

This project will be used to capture multiple small instrumentation projects to be completed at Desert Star Energy Center. The projects are intended to improve the monitoring devices at the plant by replacing outdated equipment or upgrading to better technology.

For example: See Projects for 2014.

DESC Electrical Improvements **$212,000**

This project will be used to capture multiple small Electrical projects to be completed at Desert Star Energy Center. The projects are intended to improve the Electrical devices at the plant by replacing outdated equipment or upgrading to better technology.

For example: See Project for 2014.

DSEC Valve Motor Operator Upgrade **$127,000**

Upgrade the aging valve motor operators throughout the plant to valves with new technology. The new design provides greater reliability

DSEC SCE Interconnection Upgrades **$212,000**

This project will be used to capture DSEC's portion of SCE's capital expenditures for the miscellaneous upgrades to the SCE Eldorado substation, as per section 9.7 of the EDE (DSEC)/SCE Eldorado Substation Additional Facilities and Interconnection Agreement

DSEC IP & LP Start-Up Vent Valve Upgrade **$750,000**

The currently installed DSEC Intermediate Pressure and Low Pressure Start-Up Vent Valves leak by, reducing steam plant efficiency. The valves are aging, and if any of them were to stick, it could result in a forced outage for repair.

4. Projects for 2016

DSEC Mechanical Improvements $212,000

This project will be used to capture multiple small mechanical projects to be completed at Desert Star Energy Center. The projects are of a mechanical, structural, or civil nature and are intended to improve plant performance, or address operational, maintenance, safety or environmental issues.

For example: See Projects for 2014.

DESC Instrumentation Improvements $212,000

This project will be used to capture multiple small instrumentation projects to be completed at Desert Star Energy Center. The projects are intended to improve the monitoring devices at the plant by replacing outdated equipment or upgrading to better technology.

For example: See Projects for 2014.

DESC Electrical Improvements $212,000

This project will be used to capture multiple small Electrical projects to be completed at Desert Star Energy Center. The projects are intended to improve the Electrical devices at the plant by replacing outdated equipment or upgrading to better technology.

For example: See Projects for 2014.

DSEC Valve Motor Operator Upgrade $127,000

Upgrade the aging valve motor operators throughout the plant to valves with new technology. The new design provides greater reliability.

DSEC ACC Fan Bay Lifting Beam/Hoist Upgrade $825,000

The Air Cooled Condenser (ACC) periodically requires fan motors and gearboxes to be removed and replaced for maintenance. The current maintenance lift design of the ACC requires multiple load transfers from beam to beam to accomplish these activities. Multiple load transfers increases the safety risk when handling these heavy loads and is also very time consuming. This upgrade will install lifting beams with sufficient span to allow fan motor and gearboxes to be moved in one lift, thus improving safety and productivity.

DSEC SCE Interconnection Upgrades $212,000

This project will be used to capture DSEC's portion of SCE's capital expenditures for the miscellaneous upgrades to the SCE Eldorado

substation, as per section 9.7 of the EDE (DSEC)/SCE Eldorado Substation Additional Facilities and Interconnection Agreement.

DSEC HRSG Superheater Condensate Detection & Drain $200,000

Install thermocouples to detect condensation in HRSG superheater drains and use the signal to automate the drain valves. The project will increase efficiency by limiting excessive blowdown during plant startup and decrease the risk of HRSG piping damage due to incomplete draining.

DSEC HRSG CO Catalyst Upgrade $1,775,000

HRSG CO Catalyst degrades over time and when the ability of the catalyst degrades to the point that emissions limits cannot be met, the catalyst must be replaced to maintain air permit conditions

DSEC CT Insulation Systems Upgrade $660,000

The CT casing insulation is at the end of its' useful life. This upgrade will replace the insulation.

5. Forecast Method

The forecasting methodology selected for Desert Star is the zero-based methodology. This method was selected because the projects selected for the facility are unique and non-repetitive. Using prior year expenses is not indicative of future spend and does not represent an effective tool for forecasting.

F. Cuyamaca Peak Plant Operational Enhancements

1. Description

SDG&E plans to build and place in service the below listed projects by the Test Year.

These forecasted capital expenditures support the company's goals of safe, reliable, low cost delivery of power.

2. Projects for 2014

CPEP Black Start Generator $1,128,000

A black start generator is needed at CPEP to provide for power restoration to the grid in the event of a blackout. This engine will provide SDG&E Grid Operations with a cranking path to the Otay Mesa Energy Center to aid in the restoration of power to the Grid.

CPEP Mechanical Improvements **$100,000**

This project will be used to capture multiple small mechanical projects to be completed at Cuyamaca Peak Energy Plant. The projects are of a mechanical, structural, or civil nature and are intended to improve plant performance, or address operational, maintenance, safety or environmental issues.

For example: Install permanent handrails ladder and platforms on the turbine roof and air inlet structures. This will provide safe access for maintenance and operations activities, and eliminate the need for temporary scaffolding.

CPEP Instrumentation Improvements **$100,000**

This project will be used to capture multiple small instrumentation projects to be completed at Cuyamaca Peak Energy Plant. The projects are intended to improve the monitoring devices at the plant by replacing outdated equipment or upgrading to better technology.

For example: Upgrade the existing obsolete weather station to one that will provide easy access to data, improved trending and fully integrate with the control network. This will improve weather monitoring to better assist plant operators and allow improved analysis for engineering.

CPEP Electrical Improvements **$100,000**

This project will be used to capture multiple small electrical projects to be completed at Cuyamaca Peak Energy Plant. The projects will address improvements in control devices that provide power solutions for operation of the plant and modifications to existing electrical distribution systems to provide ease of access to power for welding, heat treating and other ancillary power needs.

For example: Add welding outlets at strategic locations in the plant. Welding outlets are used as a source of temporary power for maintenance activities, as well as providing power for welding.

3. Projects for 2015

CPEP Mechanical Improvements **$100,000**

This project will be used to capture multiple small mechanical projects to be completed at Cuyamaca Peak Energy Plant. The projects are of a mechanical, structural, or civil nature and are intended to improve plant performance, or address operational, maintenance, safety or environmental issues.

For example: See Projects for 2014.

CPEP Instrumentation Improvements **$100,000**

This project will be used to capture multiple small instrumentation projects to be completed at Cuyamaca Peak Energy Plant. The projects are intended to improve the monitoring devices at the plant by replacing outdated equipment or upgrading to better technology.
For example: See Projects for 2014.

CPEP Electrical Improvements **$100,000**

This project will be used to capture multiple small electrical projects to be completed at Cuyamaca Peak Energy Plant. The projects will address improvements in control devices that provide power solutions for operation of the plant and modifications to existing electrical distribution systems to provide ease of access to power for welding, heat treating and other ancillary power needs.
For example: See Projects for 2014.

CPEP New Fuel Flow Metering **$229,000**

Installation of gas flow monitoring equipment in order to provide accurate measurement of gas flow to the turbines, and enable plant personnel to accurately monitor gas usage for emissions monitoring regulatory purposes.

CPEP Micronet Control System Upgrade to Ovation **$1,083,000**

Upgrade the current turbine control system with an alternate control system, as well as upgrading existing HMI's to HMI's with current operating systems and security software. This control system upgrade provides improvements to the following: system security, operator graphical and functional interface, ability to customize the operator interface, ability to make improvements to control functions, data collection and storage, trending and analysis, plant and system troubleshooting, and simplified network architecture.

4. Projects for 2016

CPEP Mechanical Improvements **$100,000**

This project will be used to capture multiple small mechanical projects to be completed at Cuyamaca Peak Energy Plant. The projects are of a mechanical, structural, or civil nature and are intended to improve plant performance, or address operational, maintenance, safety or environmental issues.
For example: See Projects for 2014.

CPEP Instrumentation Improvements **$100,000**

This project will be used to capture multiple small instrumentation projects to be completed at Cuyamaca Peak Energy Plant. The projects are intended to improve the monitoring devices at the plant by replacing outdated equipment or upgrading to better technology.
For example: See Projects for 2014.

CPEP Electrical Improvements **$100,000**

This project will be used to capture multiple small electrical projects to be completed at Cuyamaca Peak Energy Plant. The projects will address improvements in control devices that provide power solutions for operation of the plant and modifications to existing electrical distribution systems to provide ease of access to power for welding, heat treating and other ancillary power needs.
For example: See Projects for 2014.

5. Forecast Method

The forecasting methodology selected for Cuyamaca Peak is the zero-based methodology. This method was selected because the projects selected for the facilities are unique and non-repetitive. Using prior year expenses is not indicative of future spend and does not represent an effective tool for forecasting.

V. CONCLUSION

This testimony describes the activities of SDG&E's Electric Generation activities, and presents the forecast for both existing and reasonably anticipated new expenses for the GRC test year 2016. This testimony and my workpapers demonstrate the justification for the requested funding so that SDG&E can continue to meet its obligations to applicable regulations and provide safe and reliable service. I request the Commission to approve funding for the expenses and projects presented here.

This concludes my prepared direct testimony.

VI. WITNESS QUALIFICATIONS

My name is Carl LaPeter. My business address is 2300 Harveson Place, Escondido, CA 92029. I am employed by San Diego Gas & Electric Company (SDG&E) as Plant Manager in the Generation and Resource Planning department.

My responsibilities include managing, directing planning and coordinating the overall site operation and maintenance of the Palomar, Miramar and Cuyamaca Peak power plants. I hold a Bachelor of Science degree in Nuclear Engineering Technology from Excelsior College in Albany, NY. I am also a veteran of the U.S. Navy's Nuclear Power Program.

I joined SDG&E in May 2005 as the Plant Engineer for Palomar Energy Center, then served as the Maintenance Manager, and was promoted to my current position of Plant Manager August 2011. I have been employed in the power generation industry for more than 30 years in positions of increasing responsibility. I have experience with management, operations and maintenance, construction management, commissioning, and mobilization of power plants utilizing nuclear and natural gas technology.

I am familiar with the design, operation and maintenance of heavy industrial turbines, aero derivative turbines, steam turbines, generators, reciprocating engines, and nuclear power plants.

I am sponsoring the Electric Generation Operations and Maintenance expenses as well as the Electric Generation Capital spending testimony. I have previously prepared testimony for the Commission.

APPENDIX A – Glossary of Terms

ACC	Air Cooled Condenser
CARB	California Air Resource Board
CEC	California Energy Commission
CO	Carbon Monoxide
CPEP	Cuyamaca Peak Energy Plant
CPI	Consumer Price Index
CPUC	California Public Utilities Commission
CT	Combustion Turbine-Generator
DSEC	Desert Star Energy Center
ERRA	Energy Resource Recovery Account
GE	General Electric
GHG	Green House Gas
GRC	General Rate Case
GSU	Generator Step-Up Transformer
HMI	Human Machine Interface
HRH	Hot Reheat
HRSG	Heat Recovery Steam Generator
LCI	Load Commutator Inverter
LTPP	Long Term Procurement Plan
LTSA	Long Term Service Agreement
LVDT	Linear Variable Displacement Transformer
MEF	Miramar Energy Facility
MW	Mega Watt
NERC	North American Electric Reliability Corporation
NOx	Nitrogen Oxide
O&M	Operations & Maintenance
OEM	Original Equipment Manufactures
PEC	Palomar Energy Center
PLC	Programmable Logic Controller
PV	Photovoltaic
RPS	Renewable Portfolio Standard
SCR	Selective Catalytic Reduction
SDG&E	San Diego Gas & Electric Company
SoCalGas	Southern California Gas Company
SONGS	San Onofre Nuclear Generating Station
ST	Steam Turbine-Generator
SVP	Senior Vice President
TAA	Turnkey Acquisition Agreement
VP	Vice President