Application of San Diego Gas & Electric Company (U-902-E) for Adoption of an Advanced Metering Infrastructure Deployment Scenario and Associated Cost Recovery and Rate Design.

Application 05-03-015
Exhibit No: _____

CHAPTER 4
ELECTRIC TRANSMISSION AND DISTRIBUTION SYSTEM BENEFITS

Prepared Supplemental, Consolidating, Superseding and Replacement Testimony of
PATRICK T. LEE

SAN DIEGO GAS & ELECTRIC COMPANY

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

MARCH 28, 2006

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I. INTRODUCTION

The purpose of my testimony is to describe the costs and benefits that will be realized in the transmission and distribution areas of SDG&E with the deployment of Advanced Metering Infrastructure (AMI). Specifically, I discuss the benefits associated with the Transmission and Distribution System listed in Table PL 4-1.

This testimony consolidates, supersedes, and replaces all previous direct and supplemental testimony filed by me or by any other SDG&E witness testifying in this docket, on the topics covered herein.

Table PL 4-1 – Summary of Benefits

Table PL 4-1

Transmission and Distribution Benefits ($ thousands)

	Net Benefits (not loaded, not escalated)				
	2008	2009	2010	2011-2022	2023-2038
Total T&D Capital Item Net Benefits	0	0	2,819	11,703	3,347
Total T&D O&M Item Net Benefits	0	0	513	6,154	8,205

II. DISCUSSION

The benefits of implementing AMI on the Transmission and Distribution (T&D) systems can be grouped into three categories: 1) demand reduction benefits; 2) outage management benefits; and 3) significant other efficiencies and related benefits including providing foundational technology for projects such as system automation and the smart grid concept. T&D demand reduction benefits include the deferral of transmission line projects, the deferral of distribution capacity projects and avoided distribution capacity additions. The T&D outage management benefits include a reduction in labor associated

with the response to customer outage calls, automatic outage analysis, crew deployment improvements and emergency and planned switching support. The outage management benefits included here are for normal and storm operations. The other efficiencies and related benefits include the improvement of load forecast accuracy, elimination of drag hand reads and elimination of transformer load reads. SDG&E expects improvements in the optimization of capital expenditures due to improved accuracy and resolution of customer load data, but such improvements are difficult to quantify and have not been included in T&D benefit estimates. Table PL 4-1 provides a summary and description of T&D benefits.

A. Assumptions and Methodology

The potential T&D benefits due to demand response reductions are estimates based on the following key assumptions. First, AMI and AB1X compliant dynamic rates are implemented concurrently and are sustainable to ensure that the full benefits of demand response are realized (as described further in Mr. Gaines' testimony (Chapter 5) and Dr. George's testimony (Chapter 6). Second, forecasted demand reductions accurately predict demand response (again, further described in Dr. George's testimony (Chapter 6)). Third, the deferral or avoidance of future distribution capacity projects is based on demand reduction assumptions that require peak load reductions to: a) be of a sufficient minimum magnitude, b) be realized at the area of the proposed project(s), c) be fully realized prior to the proposed project(s), d) occur during the peak loads of the equipment affected by the proposed project(s), and e) provide physical assurance that load reductions will actually occur. These five assumptions (labeled a-e above) are seen as reasonable and attainable. Fourth, that distribution deferred or avoided capacity projects may lag demand response by 1-3 years.

B. Transmission and Distribution (T&D) Benefits

1. Demand Response Benefits

The Charles River Associates (CRA) econometric model predicts peak demand load reductions for full deployment scenarios as further elaborated in Dr. George's testimony (Chapter 6). These load reductions will be incorporated in future electric system planning as they are realized.

a. T&D Capital Deferral Benefits

SDG&E estimates potential savings associated with the deferral of transmission capital projects by using CRA predicted peak demand load reductions and reviewing planned projects. According to the timing and magnitude of projected demand reduction in future years, a number of transmission projects between 2011 and 2020 were targeted for deferral. SDG&E also estimates potential savings associated with the deferral of distribution capacity capital projects by applying CRA predicted peak demand load reductions to expected future distribution capacity projects.

b. Avoided Distribution Transformer Additions Benefits

With the predicted demand response reductions SDG&E believes that it will be able to modify its design practices for greenfield developments. Based on the CRA predicted peak demand reductions, SDG&E estimates the potential savings associated with avoiding distribution transformer capital additions.

2. Outage Management Benefits

T&D Outage Management benefits can be accrued due to the additional availability and resolution of operational data provided by the AMI system. With this system in place and software to provide information for better decision support, the Distribution System Operator and Dispatcher can improve operational efficiencies and better dispatch and utilize Electric Trouble Shooters.

a. Customer Outage Calls

With the AMI system it will be possible to determine via a real-time query whether a customer's premise is actually energized. This avoids sending Electric Trouble Shooters to verify customer calls as well as improved Dispatcher efficiency.

b. Automated Outage Analysis

Once an outage is detected either during normal operations or during a storm, the Distribution Operator has to filter outage information to reduce duplicate secondary orders and regroup/redirect Electric Trouble Shooters.

Customer outages are automatically reported in the AMI system and associated software will enable SDG&E Distribution Operations to improve Dispatcher efficiency and avoid sending Electric Trouble Shooters to outages that previously were incorrectly declared by the system, or outages that have already been restored.

c. Crew Deployment Improvements

The AMI system will enable SDG&E to improve its outage management by ensuring customers are fully restored prior to sending crews back to the District Office and reducing manpower associated with customer call backs after the outage has been restored.

d. Emergency and Planned Switching Support

SDG&E estimates a reduction in Electric Trouble Shooter labor associated with a reduction in the number of load reads associated with switching operation on the Distribution System.

3. Other Benefits

SDG&E believes that there are some additional capital and O&M benefits that will occur with the system wide implementation of AMI. These other benefits are described below.

a. Improvements in Capital Addition Efficiency

With the full deployment of AMI to all of SDG&E's approximately 1.4 million customers, SDG&E will have improved resolution of the loading on its system at all times. SDG&E currently has limited data resolution available and believes that this will improve the efficiency of planning capital additions, right sizing transformers and optimally locating capacitor banks. This improved data will augment SDG&E's current capability in distribution system modeling and analysis, resulting in savings associated with the annual distribution capacity capital budget.

b. Load Forecasting Data Accuracy Benefits

SDG&E estimates potential capital and O&M savings associated with improved meter accuracy and more timely load information resulting in improved forecasting accuracy. The estimated potential capital savings

are due to the deferral of distribution capital capacity projects for non-SCADA substations.

c. Eliminate Drag Hand Reads

SDG&E estimates there will be O&M savings due to the reduction in labor hours associated with eliminating drag hand load reads of non-SCADA substations.

d. Eliminate Other Load Reads – Transformer Loading

SDG&E also estimates O&M savings due to the reduction in other load reads associated with transformer loading.

e. Foundational Technology

Implementation of the AMI system ultimately provides endpoint data via two way communication that is a foundation for some of the smart grid concepts. The AMI meters and back office system discussed in Ms. Welch's testimony (Chapter 10) and Mr. Pruschki's testimony (Chapter 11) are fundamental components necessary for the smart grid. The AMI communication system is also compatible or complementary with the smart grid.

III. AMI PROJECT RISKS AND SDG&E MITIGATION EFFORTS

To defer the transmission and distribution capital expenditures outlined in this chapter, demand response must be geographically located in the right areas that potentially need transmission or distribution capacity projects. The customers' demand response must be of the right magnitude so as to reduce the peak load that creates the need for the transmission or distribution capacity project. The demand response must also be available at the right time and provide physical assurance of performance, so that the construction of that project can be deferred. To mitigate the risk associated with customers' demand response SDG&E eschewed an econometric approach to calculating the impact of demand response on the load forecast and based its calculations on historical capital projects on the distribution system and load flow simulations on the transmission system. For distribution SDG&E determined the number of projects and corresponding overloads that could have been deferred by the demand response as a percentage of system peak. The transmission values were calculated based on a load

flow analysis of SDG&E's system load forecast with and without the AMI demand response number.

The O&M benefits detailed in the outage management and other benefits sections are unaffected by customer demand response. The benefits accrue due to the AMI system itself and the associated back-office IT systems.

This concludes my testimony.

IV. QUALIFICATIONS OF PATRICK LEE

My name is Patrick Lee. My business address is 8315 Overland Ave, San Diego, California, 92123. I am employed by San Diego Gas & Electric Company (SDG&E) as the Director of Electric Regional Operations.

My present responsibilities include electric distribution construction, maintenance, field operations, skills and compliance training, and business processes support & performance management. In this capacity, I provide leadership for public and employee safety, electric system reliability, work management, budget management, and workforce management.

I earned a Bachelor of Science degree in electrical engineering from San Diego State University and a Masters of Science in electrical engineering from California State University, Sacramento. I am a registered professional electrical engineer in California.

Prior to my career at SDG&E, I worked for Sacramento Municipal Utility District and the Electric Department at the City of Roseville in California. I joined SDG&E in 1991 and have held positions of increasing responsibility. Some of my past experiences included electric system planning, engineering standards, transmission and substation construction and maintenance, transmission and distribution reliability, electric system automation, system protection, engineering data integration, and business process re-engineering. I have been in my current position since September of 2005.