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# SOUTHERN CALIFORNIA GAS COMPANY

# ADVANCED METERING INFRASTRUCTURE

# CHAPTER VI

# SOCALGAS AMI CONSERVATION IMPACTS AND BENEFITS

**Prepared Direct Testimony**

**of**

**John C. Martin**

**BEFORE THE PUBLIC UTILITIES COMMISSION**
**OF THE STATE OF CALIFORNIA**

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## I. INTRODUCTION

The main purpose of this testimony is to present Southern California Gas Company's ("SoCalGas") program descriptions, conservation impacts, and financial benefits for web-based and display-based feedback which employs gas usage data and network connectivity available through SoCalGas' advanced metering infrastructure ("AMI"). This testimony provides the program descriptions used by witness Dr. Sarah Darby (Chapter V) as the foundation to her assessment of estimates of conservation potential from online and display based feedback to SoCalGas customers. This testimony uses Dr. Darby's estimated percent of customer participation, savings potential and participation growth rate to calculate the therm impacts and financial benefits of web-based and display based feedback.

This testimony also quantifies the reduced carbon dioxide ("$CO_2$") emissions associated with the therm reduction impacts of SoCalGas' web-based and display-based feedback. $CO_2$ benefits of eliminating over 6.3 million vehicle miles each year, as described in Mr. Mark Serrano's testimony in Chapter III, are also quantified.

In summary this testimony supports the conclusion that web-based and display-based conservation benefits have a nominal direct value of $576 million over the analysis period (2009 through 2034). This conservation benefit is based on an approximate therm impact of one percent average annual reduction in forecasted residential core consumption. An associated $CO_2$ benefit is a nominal direct value of $28.6 million over the analysis period. The $CO_2$ benefit of eliminated vehicle miles is a nominal direct value of $0.6 million over the analysis period.

## II. GAS CONSERVATION FEEDBACK MEASURES

This section describes feedback measures SoCalGas intends to utilize to encourage gas conservation. Feedback information is demonstrated to achieve energy conservation which is documented in Dr. Darby's testimony (Chapter V). Feedback measures enabled by the SoCalGas AMI system are web-based and display-based.

### A. Web-Based Feedback

SoCalGas plans to provide customers with a web portal to Energy Management feedback pages within the secure My Account portion of the SoCalGas website. The Energy Management pages are intended to help customers better understand and manage their daily energy use and costs. The Energy Management pages will feature interactive feedback tools for next-day access to a customer's daily gas usage data (up to 24 hourly consumption intervals), including 13 months of daily gas usage history. Potentially the consumption intervals could be configurable into 3 or 4 periods per day, such as morning hours, afternoon and evening hours, and late night hours. The configurable periods are intended to be defined by the customer to reflect their individual energy usage patterns. Default period definitions could make setup easier for each customer.

The Energy Management pages will provide multiple feedback tools to increase awareness, participation, and durability of conservation and energy efficiency behaviors by customers. Customers may track their energy use, cost estimates and $CO_2$ footprint over time. Customers may compare usage to historical usage, or compare usage to other customers in their community or to other customers with similar demographics.

Customers will be able to select personal benchmarks and goals for conservation and select alerts to automatically warn them when their energy use or cost exceeds theses benchmarks and goals. The benchmarks and goals can be based on monthly or daily budgets, or based on other customers' consumption. Bill estimate threshold alerts will allow customers to make informed energy use decisions before receiving their bills. Alerts may also be sent when customer's consumption or cost estimate is higher or lower then the pervious day, week, month, or year, or when the customer's consumption during the month moves to a higher cost rate tier.

The alerts may congratulate customers for achieving conservation goals, or may be combined with conservation and energy efficiency tips and measure recommendations, or may direct customers to specific programs and advice services based on their particular usage patterns and demographics. The alerts method can be configured by the customer to include e-mails, web

alerts, text messages, phones calls, in-home display messages, energy management system notifications, and customers may authorize notifications to third parties such as relatives, neighbors or friends.

### B. Display-Based Feedback

SoCalGas intends to provide a secure customer interface to enable in-premise or in-home displays as a means to provide customers a more immediate (direct) feedback of their gas usage data. The display based interface provides conservation feedback information to customers that may not have access to web-based feedback, or prefer a complementary feedback method to their web-based feedback. Display-based feedback allows for more immediate access to a customer's consumption information than the next-day access provided by the web-based feedback. More immediate gas data access may include periodic hourly or real-time gas feedback data.

Real-time gas feedback data transmissions can be a challenge for battery powered gas meter modules, due to the energy consumed by the radio transmitter each time it is operated to communicate data. In general, battery powered sensor devices, turn off the radio transmitter to conserve battery power (sleep), and only turn on the radio transmitter for predetermined communication windows. This sleep strategy greatly increases the longevity of the battery, thus reducing the number of battery replacements over the device's life. SoCalGas and AMI vendors are concerned that battery life may be considerably reduced with hourly or near real-time radio transmissions. Battery powered gas meter modules may be able to record hourly gas consumption while the transmitter sleeps, then wake up the radio transmitter a few times per day to send the data back to the AMI communications network. Several gas AMI vendors claim they can maintain reasonable battery life and communicate consumption data 3 or 4 times per day.[1] Potentially these 3 or 4 daily communications could be hourly data or be customer configurable periods. Tariffed rates and or programs may be designed to provide more real-time transmission of gas consumption data to customers willing to pay extra to compensate for the shortened

[1] Based on confidential RFP responses.

battery life of the gas meter module. Tariffed rates and programs will also be developed to provide in-home or in-premise devices at cost to customers.

### C. Feedback Customer Research and Communications

SoCal Gas intends to support and encourage web-based and display-based feedback methods with customer research and communications. Customer research will help guide SoCal Gas in the design and implementation of effect feedback web pages and data presentations for in-home or in-premise displays. Customer communications will increase customer awareness of the availability and value of these new services helping to ensure participation. SoCal Gas intends to integrate web-based and display-based feedback measures into the company's overall communications and marketing efforts. The costs of customer research and communications are estimated to be $5.5 million.

### D. Feedback Technology Development

SoCalGas intends to support technology development by third parties to promote innovative uses of web-based and display-based feedback interfaces to improve conservation and energy efficiency. Much of the current technology development in energy feedback is concentrated on electricity uses. SoCalGas plans to encourage feedback technology development for not only gas, but water conservation and efficiency technologies as well.

The industry needs encouragement to develop new devices such as a low cost real-time gas meters that overcomes battery life constrains and to develop new technologies to securely integrate gas feedback data with water and electricity metering systems. The industry also needs research and development encouragement for a broad and compelling set of cost effective feedback tools to help customers increase awareness of their energy use, increase motivation to conserve, and increase durability of their conservation and energy efficiency efforts.

## III. FEEDBACK CONSERVATION IMPACTS AND BENEFITS

This section describes the impacts and benefit estimate for both conservation and carbon dioxide reductions. The first part of this section describes the conservation methodology and results, and the second part of this section describes the $CO_2$ methodology and results. Annual benefits are estimated for each year of the analysis period from 2009 through 2034.

### A. Web-Based and Display-Based Conservation

The conservation benefit model is built for both of the conservation feedback modes described earlier in this chapter. The general model used for both of these programs has the following computational factors:

1. Annual natural gas consumption for target market population (Mdth)
2. Expected Customer Participation (%)
3. Expected Savings/Conservation Potential (%)
4. Expected Participation Growth Rate (%)
5. Expected AMI meters installed for the population (%)
6. Annual average WACOG forecast ($/dth)
7. Avoidable Franchise Fees (%)

By multiplying the first five factors together the result is annual avoided gas consumption impacts. By multiplying the seven factors together the result is the annual dollar savings associated with the avoided gas consumption. Item 1 is from the 2008 California Gas Report energy use forecast for residential single and multi-family customers. Items 2, 3, and 4 are provided in Dr. Darby's testimony. Item 5 is based on the meter installation assumptions used throughout this application. Item 6 is the Retail Core Commodity Weighted-Average-Cost-of-Gas for Purchases from the 2008 California Gas Report. Item 7 is based SoCalGas' latest general rate case ("GRC") decision, D.08-07-046.

### B. $CO_2$ Benefits of Avoided Therms and Gasoline

$CO_2$ benefits are estimated by converting the annual natural gas (therm) and mileage savings to $CO_2$ equivalents, multiplied by expected AMI meters connected for the population, multiplied by an environmental impact value.

Conversions from energy sources to $CO_2$ equivalents are based on the Energy Information Administration ("EIA") voluntary reporting coefficients[2]. The therms from conservation feedback are converted to tons of $CO_2$ using the EIA coefficient for pipeline natural gas of 117.08 pounds of $CO_2$ per MMBTU. The avoided meter reading mileage was converted to gallons of gasoline using an assumed 22.2 miles per gallon average fuel efficiency, and then applying the EIA's coefficient for motor gasoline of 19.564 pounds of $CO_2$ per gallon.

The eliminated vehicle miles from Mr. Serrano's testimony (Chapter III) is escalated annually based on the growth rate of meters. $CO_2$ impacts are valued using the California Public Utilities Commission approved value of $8 per ton[3], escalated to $9.02 for inflation using the Federal Consumer Price Index and $30 per ton. Table VI-1 provides the range of $CO_2$ benefits based on these two values.

**Table VI-1**

**Range of $CO_2$ Benefits (2011-2034)**

**2008 Direct Dollars in Millions**

| | $8/Ton | $30/Ton |
|---|---|---|
| Eliminated Vehicle Miles | $0.6 | $2.0 |
| Feedback Conservation | $28.6 | $95.2 |
| Total Carbon Dioxide Benefits | $29.2 | $97.2 |

[2] http://www.eia.doe.gov/oiaf/1605/coefficients.html downloaded 8/23/2008.
[3] Decision 05-04-024, Finding of Fact #5, p. 43.

## IV. CONCLUSION

As stated earlier in this testimony, web-based and display-based conservation benefits have a nominal direct value of $576 million over the analysis period. The associated $CO_2$ benefit is a nominal direct value of $28.6 million over the analysis period. The $CO_2$ benefit of eliminated vehicle miles is a nominal direct value of $0.6 million over the analysis period. Table VI-2 breaks down these benefits between the Deployment Period and the Post-deployment period.

**Table VI-2**

**Summary of Conservation Benefits &**

**Customer Research and Communications Costs**

**2008 Direct Dollars in Millions**

| | Deployment Period 2011-2015 | Post-deployment Period 2016-2034 |
|---|---|---|
| Costs | | |
| Customer Research | $0.4 | $0 |
| Customer Communications | $5.2 | $0 |
| Total Costs | $5.5 | $0 |
| Benefits | | |
| Feedback Conservation | $44.8 | $530.9 |
| Carbon Dioxide ($8/ton) | $3.2 | $26.0 |
| Total Benefits | $48.1 | $556.9 |

## V. WITNESS QUALIFICATIONS

My name is John C. Martin. My business address is 9305 Lightwave Avenue, San Diego, California 92123. I am employed by San Diego Gas & Electric Company as the Home Area Network Manager for the Smart Meter project.

I have over 18 years of energy industry experience. My current duties focus on costs and benefits associate with the capabilities of AMI and Home Area Network. This work draws upon my broad experience in the electricity and oil industry. My prior electricity work experience includes demand response program and tariff development, electricity trading and scheduling, demand side management program evaluation and load research of customer energy use. My duties also utilize my financial analysis experience in the oil refining, trading, and marking industry.

My education is in the general area of resource economics. I graduated from Cornell University in 1988 with a master's degree in agricultural economics. My bachelors of Science degree was granted by Purdue University in 1984 in business and farm management.

I have previously testified before the California Public Utilities Commission.

This concludes my testimony.