**BEFORE THE**
**TENNESSEE REGULATORY AUTHORITY**

**PREPARED REBUTTAL TESTIMONY**
**OF**
**DANIEL J. NIKOLICH**

**IN RE:**
**CHATTANOOGA GAS COMPANY**
**DOCKET NO. 09-00183**

Electronically Filed 4/5/10 at 4:20pm

**Q. Please state your name, position, and address.**

A. Daniel J. Nikolich, Manager, Planning and Forecasting, AGL Services Company. My business address is 10 Peachtree Place, Location 1686, Atlanta, Georgia 30309.

**Q. Are you the same Daniel J. Nikolich who previously provided prepared direct testimony in this proceeding?**

A. Yes, I am.

**Q. What is the purpose of your rebuttal testimony?**

A. The Tennessee Attorney General Consumer Advocate and Protection Division ("CAPD") sponsored the testimony of witnesses in this proceeding, Dr. David Dismukes who offered testimony on the Company's proposed energySMART program addressed in my direct testimony. My rebuttal testimony responds to CAPD's testimony regarding assumptions and assertions made by Dr. Dismukes regarding the energySMART program and their use in revising the cost/benefit analysis presented by the Company.

**Q. Are you sponsoring any exhibits that accompany your prepared rebuttal testimony?**

A. Yes, I am sponsoring the following exhibits that will be covered later in my testimony:

Exhibit DJN-4 -Revised CAPD Style Participation Rate Analysis

Exhibit DJN-5 -Low Income Participation Rate Analysis

Exhibit DJN-6 –US National Residential Delivered Gas Costs 1970-2009

Exhibit DJN-7 –CAPD Equipment Lives Compared to CPUC Standards

Exhibit DJN-8 – American Council for an Energy Efficient Economy - Water Heater Costs

Exhibit DJN-9 – California 2004/2005 Statewide Residential Retrofit Single Family Energy Efficiency Rebate Evaluation

Exhibit DJN-10 –2006-2008 Chattanooga Gas Energy Efficiency Rebate Kick Back Analysis

**Q. Please explain the nature and use of cost/benefit analysis presented by both you and Dr. Dismukes?**

A. Dr. Dismukes and I have both presented cost/benefit analysis of the energySMART program based upon estimates of the future: economic factors, market conditions, customer participation, energy savings, equipment cost, gas prices, and the Company's rate structure.

Given this, the Company recognizes that the number of actual participants and resulting benefits costs may differ from those as projected based upon market conditions, energy prices and other external factors, as stated in my pre-filed testimony on p.16, lines 16-18. Implicit in Dr. Dismukes recommendation for monitoring, verification and performance standards with regard to testimony in both this case and in docket no. 09-00104, regarding Piedmont Natural Gas' energy efficiency programs, is a similar recognition that actual conditions and results may differ from those projected. As such the cost benefits presented by both Company and CAPD witnesses are meant to provide the TRA with a guide in evaluating the potential benefits and costs of the Company's proposed program from different yet important points of view.

**Q. What is the Company's position on the TRA setting independent monitoring and verification mechanisms as proposed by Dr. Dismukes?**

A. The Company would support outside annual monitoring and verification by an independent third party. An example of an independent party could be to have one of the universities in Tennessee perform the annual monitoring, verification, and evaluation. This is being done in New Jersey for Elizabethtown Gas by the Center for Energy, Economic and Environmental Policy at Rutgers. Another example of independent monitoring is the Energy Conservation and Efficiency Advisory Group that meets periodically to evaluate, review, and recommend adjustments to the Company's Virginia affiliate's conservation and energy efficiency programs and their outreach efforts. The advisory group includes state and local government officials, members of the Virginia legislature, and local community and religious

leaders. That the Company is willing and able to provide the necessary data as shown by its response to CAPD discovery request number 173. In the response, the Company provided for all pilot rebate programs from 2006-2009 a complete data set identifying which program a customer received a rebate under, how much gas was used before the measure was taken, and how much gas was used afterwards, and a calculation of the change in normalized usage by customer premise, in the electronic spreadsheet version of the response, thereby demonstrating that the Company has the capacity and the willingness to provide the data that independent third party evaluation and monitoring would require.

**Q. The proposed energySMART program fails the Rate Payer Impact Measure (RIM) test in both the Company's revised Cost Benefit analysis and Dr. Dismukes' analysis, is this sufficient reason for the TRA to reject the Company's program?**

A. No. First, the RIM test should not be the only or primary test considered, but rather it should be considered as one of five tests with each providing a different perspective on the potential effectiveness of a program. A fundamental tenet of cost benefit analysis is that costs and benefits do not accrue equally to all. Different groups have varying perspectives on program costs and benefits. The RIM test looks at programs only from the point of view from non-participating ratepayers. Further, the test as employed by both the Company and CAPD witness, assumes that the program will only be offered for five years. This distorts the view of the test, in that all customers eventually have to replace their equipment and if the program is continued all customers could benefit.

Second, the practical result of the RIM test is to suggest that the Company will need to recover costs of the energySMART program through a rider as proposed or through a future rate increase. This is entirely consistent with the State of Tennessee's new conservation policy as enumerated in section 53 of Public Chapter 531 enacted in 2009, as shown in the following passage:

> "... that provides timely cost recovery and a timely earnings opportunity for utilities associated with cost-effective measurable and verifiable efficiency savings, in a way that sustains or enhances utility customers; incentives to use energy more efficiently."

From this passage, one can infer that the policy anticipates unfavorable RIM tests may result that by calling for "timely cost recovery". Therefore, the Company asserts that as a measure in evaluating program alternatives, the RIM test should be employed, but that failure of the RIM test by programs should not mean rejection of the proposed program.

**Q. As stated in Dr. Dismukes testimony, for the CAPD's version of the cost-benefit analysis, he made changes to the underlying assumptions, does the Company agree that these changes were reasonable and modest?**

A. In some cases, the Company finds Dr. Dismukes' changes acceptable and in others they are not. Specifically, the CAPD analysis contains the following changes:

1. Changed the underlying participation rates based upon using 6 months of data for the Company's Virginia affiliate as it was an entire year's data;

2. Elimination of the inflation adjustment for capacity costs;

3. Includes lost margin revenue even though the Company proposed the Alignment and Usage Adjustment (AUA) that would prevent margin revenue loss as result of usage declines;

4. Applied service lives to equipment based upon the California Public Utility Commission's (CPUC) data;

5. Changed the customer incremental cost assumption for tankless water heaters and food service equipment;

6. Made adjustments to energy savings based upon average estimates from other states, ignoring actual customer data from Chattanooga Gas Customers; and

7. Applied not very moderate net to gross assumptions regarding free riders, spillover and kickback, based upon a stale survey on 2004-2005 California customers self reported survey results.

**Q. Why were the changes to participation rates made for the CAPD's analysis inadequate?**

A. Dr. Dismukes' work papers filed in response to the Company's data request number 2, show that initial year 1 participation rates for programmable thermostats, low income weatherization, residential high efficiency furnace incentives, tankless water heater incentives, and high efficiency storage water heater incentives used were based upon the ratio of 6 months participation of the similar program at VNG to the

annual average residential customer count for 2009. First, this understates participation by 50% in most cases. Exhibit DJN-4 presents what these results would have been if the correct adjustment for program length had been made. Second this assumes that the underlying residential renovation market is comparable to higher income Hampton Roads area of Virginia. The Company's analysis by its marketing department took into account the size of the potential market, rebate, promotional efforts proposed, and experience with pilot programs over the course of the past four years. Finally, if setting the participation rate for low income weatherization based upon another state where the Company has an affiliate is appropriate, then Elizabethtown Gas where a program has been in effect year round for the last four years would have produced a more reasonable participation estimate even higher than the Company's current estimate as shown in Exhibit DJN-5.

**Q. Does the Company agree with the elimination of inflation adjustment to escalate capacity costs?**

A. No. Cost/benefit analysis looks out over a long time horizon based on equipment effective lives of which exceed 20 years in some cases. In fact over the long term the Company's use of a 2.5% inflation rate may be low based upon data provided by Dr. Dismukes in response to Company's data request number 35. As can be seen in exhibit DJN-6, the annual long term increase in the delivered price of natural gas to residential gas customers has been 5.4% per year over the past 10 years, and 8% per year over the past 40 years, with the non-gas portion of the price as computed by taking the well head difference from the delivered price, has risen 6.3% per year over the past 10 years, and 5.6% per year over the past 40 years. This coupled with

the recent increase in the C-2 demand rate that went into effect October 1, 2009 (a rate based upon the average interstate demand and capacity cost per Dth of design day requirement) strongly suggest that accounting for a long term modest escalation in capacity costs would be appropriate.

**Q. Does the Company agree with inclusion of lost margin revenues into the cost benefit analysis?**

A. If the Company's proposed AUA or a Straight Fixed Variable (SFV) rate design as presented in Mr. Yardley's rebuttal testimony is assumed as was in the Company's analysis, then no. In this case, declines in usage would have no effect on the Company's margins. If no AUA and the CAPD's proposed rate structure are assumed then inclusion of lost revenues is entirely appropriate.

**Q. Does the Company agree with the equipment lives put forth in the CAPD's cost/benefit analysis?**

A. Exhibit DJN-7, shows equipment life analysis performed in support of the CAPD's assumptions updated with the addition of the CPUC standards. These lives are based upon effective useful life, meaning the economic use to one owner at a premise and assuming at some point to be made obsolete before the end of its real life by improved technology. However, that stated, the CAPD's proposed equipment life, while tending to be at the low end is within the acceptable range for equipment life.

**Q. Does the Company agree with changes to incremental equipment cost for tankless water heaters and food service equipment included in the CAPD's cost/benefit analysis?**

A. The Company acknowledges that in some instances where a customer would have to install new larger water and gas lines as well as make additional accommodations for venting, tankless water heaters may cost as much as the CAPD level indicates. However, the Company believes that the average incremental installation cost more closely resembles that put forth by the American Council for an Energy Efficient Economy and shown in Exhibit DJN-8. As for food service equipment, the additional $200 cost in the CAPD estimate is within any margin of error in the incremental cost estimate.

**Q. Does the Company agree with the changes made to energy savings made for the CAPD analysis?**

A. No. Dr. Dismukes compared energy savings to other jurisdictions where the Company has local distribution affiliates. Absent actual information about natural gas consumption by Chattanooga Gas customers, this method is as good a bad choice as any other. In fact, even though including a utility with almost 40% colder weather than Chattanooga, Elizabethtown Gas, for some savings estimates, a result similar to the Company's happened. However, in this case and in discovery the Company has provided actual weather load information that has been accepted by the CAPD for use in the Attrition year forecast, by their witness David Peters. Further, in answering CAPD data request number 173, the Company provided actual

before and after load data for every CGC customer that received an appliance rebate from the company for energy efficient equipment. This was the data used by the Company to arrive at its usage estimates. Given that the Company's savings estimates are based upon actual CGC data that was made available, the sub-optimal method used to arrive at the CAPD analysis energy savings estimates need not have been employed.

**Q. Does the Company agree with the "modest" changes made to account for free rider ship, spillover, and kick back effects?**

A. First, the "modest' assumption was not modest; rather, for most cases the assumption resulted in a 42% reduction of effective energy savings. The basis for the assumptions used by the CAPD is the CPUC standards. These standards are based upon a 2004-2005 residential study of retro-fit appliance rebates based upon self reported survey data of California residential customers. I've attached the study as Exhibit DJN-9. Using this data assumes that the 2004-2005 California housing market is the same as that of Chattanooga. It also assumes housing prices, incomes, and weather are similar. When a service territory that includes San Diego, a housing market where a home similar to a typical craftsman bungalow that sells now for $100,000 in Chattanooga could have sold for $500,000 to $1,000,000, this clearly is not the case. Since then market conditions have also changed, having gone through the high energy prices resulting from the hurricanes in 2005, a crash in the housing market, and entering into a recession. In addition at the time of the study, California had a long history of appliance rebates and availability of energy efficient equipment

as a result in their market. Chattanooga does not. If this program is adopted it will be the first sustained effort to provide energy efficiency incentives to customers.

An example of how faulty the resulting logic of these "modest" adjustments is seen in the use of 58% net to gross assumption for tankless water heaters that the CAPD analysis uses. This assumption implies that 42% of all customers replacing their water heater would have done so with a tankless water heater anyway, even though according to the CAPD's analysis a tankless water heater would cost a customer an additional $1700 while receiving only an $85 per year reduction in their bill. Therefore, 20 years would be required to pay back the original cost of the consumer's investment in a tankless water heater, without taking into account the time value of money. Given this how can 42% of the customers be opting for tankless water heaters?

Further, the CAPD analysis applies these same residential not so modest reductions to commercial customers without any support. What small commercial business would accept a 20 year pay back on capital investment with no rate of return?

Next, as shown in Exhibit DJN-10, based upon the Company's response to CAPD data request number 173, kick back volumes were incorporated through use of the average customer savings amount. As shown, from 2006-2008 of the 91 customers receiving rebates for high efficiency furnaces 70 reduced their load by an average of -225 therms while 21 increased their load by 224 therms on average. For the 98 accounts who received tankless water rebates from 2006-2008, 70 averaged a 174 usage therm reduction, while 28 experienced a 100 therm usage increase. By using

the overall average of 107 therms for the high efficiency furnace incentive, and 88 therms for the tankless water heater incentive, the kick back effect of increased revenue from a percentage of customers who actually increased their load is already baked in. Building an additional amount for this into the net to gross ratio as was done for the CAPD analysis is essentially a double counting of this effect.

Overall, the Company recognizes that there is some level of free ridership that should be included. Also, the Company recognizes that this will change over time. However, the levels of free ridership as represented in the net to gross ratios used in the CAPD cost benefit analysis the Company finds excessive.

**Q. Does this conclude your testimony?**

A. Yes.

**CAPD Participation Rate Calculation**
*based upon 6 to 7 Months Data only*

| | Virginia Natural Gas | | | | Chattanooga Gas Company | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Accounts | Period | Months | Participants % of Customers | | | | | | |
| 2009 Average Number of Customers | | | | | | | | | | |
| Residential Customers | 249,453 | Jan to Dec 2009 | 12 | | 53,108 | | | | | |
| Number of Participants | | | | | Double by 5th Year Capped at Company Projection New Participation Levels | | | | | Annual Increase |
| High Efficiency | | | | | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | |
| 90% Furnace | 616 | Apr to Sep 2009 | 6 | 0.247% | 131 | 164 | 197 | 230 | 262 | 33 |
| Tankless Water Heater | 257 | Apr to Sep 2009 | 6 | 0.103% | 55 | 68 | 82 | 96 | 109 | 14 |
| High Efficiency Storage Water Heater (.62 EF+) | 94 | Apr to Sep 2009 | 6 | 0.038% | 20 | 25 | 30 | 35 | 40 | 5 |
| Programmable Thermostat | 4,483 | Mar to Sep 2009 | 7 | 1.797% | 954 | 1,091 | 1,227 | 1,364 | 1,500 | 136 |
| Low Income Weatherization | 79 | Apr to Sep 2009 | 6 | 0.032% | 17 | 21 | 25 | 29 | 34 | 4 |

**Revised CAPD Participation Rate Calculation**
*Adjusted to Full Year Levels*

| | Virginia Natural Gas | | | | | Chattanooga Gas Company | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Accounts | Period | Months | Month Adjustment | Participants % of Customers | | | | | | |
| 2009 Average Number of Customers | | | | | | | | | | | |
| Residential Customers | 249,453 | Jan to Dec 2009 | 12 | | | 53,108 | | | | | |
| Number of Participants | | | | | | Double by 5th Year Capped at Company Projection New Participation Levels | | | | | Annual Increase |
| High Efficiency | | | | | | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | |
| 90% Furnace | 616 | Apr to Sep 2009 | 6 | 2.0 | 0.494% | 262 | 328 | 393 | 459 | 525 | 66 |
| Tankless Water Heater | 257 | Apr to Sep 2009 | 6 | 2.0 | 0.206% | 109 | 137 | 164 | 192 | 219 | 27 |
| High Efficiency Storage Water Heater (.62 EF+) | 94 | Apr to Sep 2009 | 6 | 2.0 | 0.075% | 40 | 50 | 60 | 70 | 80 | 10 |
| Programmable Thermostat | 4,483 | Mar to Sep 2009 | 7 | 1.7 | 3.081% | 1,636 | 1,602 | 1,568 | 1,534 | 1,500 | (34) |
| Low Income Weatherization | 79 | Apr to Sep 2009 | 6 | 2.0 | 0.063% | 34 | 42 | 50 | 59 | 67 | 8 |

**CAPD Low Income Participation Rate Calculation**

*based upon 6 to 7 Months Data only*

| | Virginia Natural Gas | | | | Chattanooga Gas Company | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Accounts | Period | Months | Participants % of Customers | | | | | | |
| 2009 Average Number of Customers Residential Customers | 249,453 | Jan to Dec 2009 | 12 | | 53,108 | | | | | |
| Number of Participants | | | | | Double by 5th Year Capped at Company Projection New Participation Levels | | | | | Annual Increase |
| | | | | | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | |
| Low Income Weatherization | 79 | Apr to Sep 2009 | 6 | 0.032% | 17 | 21 | 25 | 29 | 34 | 4 |

**Revised CAPD Low Income Participation Rate Calculation**

*Adjusted to Full Year Levels*

| | Virginia Natural Gas | | | | | Chattanooga Gas Company | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Accounts | Period | Months | Month Adjustment | Participants % of Customers | | | | | | |
| 2009 Average Number of Customers Residential Customers | 249,453 | Jan to Dec 2009 | 12 | | | 53,108 | | | | | |
| Number of Participants | | | | | | Double by 5th Year Capped at Company Projection New Participation Levels | | | | | Annual Increase |
| | | | | | | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | |
| Low Income Weatherization | 79 | Apr to Sep 2009 | 6 | 2.0 | 0.063% | 34 | 42 | 50 | 59 | 67 | 8 |

**Revised CAPD Low Income Participation Rate Calculation**

*Based Upon Elizabethtown Gas*

| | Elizabethtown Gas | | | | | Chattanooga Gas Company | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Accounts | Period | Months | Month Adjustment | Participants % of Customers | | | | | | |
| 2009 Average Number of Customers Residential Customers | 251,954 | Jan to Dec 2009 | 12 | | | 53,108 | | | | | |
| Number of Participants | | | | | | Double by 5th Year Capped at Company Projection New Participation Levels | | | | | Annual Increase |
| | | | | | | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | |
| Low Income Weatherization | 834 | Jan to Dec 2009 | 12 | 1.0 | 0.334% | 178 | 222 | 266 | 311 | 355 | 44 |
| Company Estimate | | | | | | 120 | 120 | 120 | 120 | 120 | 0 |

**Chattanooga Gas Company**
**U.S. Residential Natural Gas Use**
**Estimated DNG Revenue per Customer**
**And Annual percentage Rate of Increase**
*based upon Exhibit DED-17 from Direct Testimony of Dr. Dismukes*

| | U.S. Natural Gas Residential Consumption (MMcf) | (Tcf) | | U.S. Natural Gas Wellhead Price ($/Mcf) | Price Delivered to Residential ($/Mcf) | Non-Gas Price | Residential Customers | Per Customer Consumption | Estimated DNG |
|---|---|---|---|---|---|---|---|---|---|
| | | | Years (1970-2009) | 40 | 40 | 40 | | | |
| | | | Gross Precentage Increase | 2082.4% | 999.1% | 798.9% | | | |
| | | | Annual Percentage | 8.0% | 6.2% | 5.6% | | | |
| | | | Years (1999-2009) | 10 | 10 | 10 | | | |
| | | | Gross Precentage Increase | 69.4% | 79.1% | 83.8% | | | |
| | | | Annual Percentage | 5.4% | 6.0% | 6.3% | | | |
| 1970 | 4,837,432 | 4.84 | 1970 | 0.17 | 1.09 | 0.92 | 38,604,000 | 125.31 | $ 115.28 |
| 1971 | 4,971,690 | 4.97 | 1971 | 0.18 | 1.15 | 0.97 | 39,267,000 | 126.61 | $ 122.81 |
| 1972 | 5,125,982 | 5.13 | 1972 | 0.19 | 1.21 | 1.02 | 39,881,000 | 128.53 | $ 131.10 |
| 1973 | 4,879,387 | 4.88 | 1973 | 0.22 | 1.29 | 1.07 | 40,645,000 | 120.05 | $ 128.45 |
| 1974 | 4,786,128 | 4.79 | 1974 | 0.3 | 1.43 | 1.13 | 41,509,000 | 115.30 | $ 130.29 |
| 1975 | 4,924,124 | 4.92 | 1975 | 0.44 | 1.71 | 1.27 | 41,516,000 | 118.61 | $ 150.63 |
| 1976 | 5,051,360 | 5.05 | 1976 | 0.58 | 1.98 | 1.4 | 41,238,000 | 122.49 | $ 171.49 |
| 1977 | 4,821,485 | 4.82 | 1977 | 0.79 | 2.35 | 1.56 | 41,366,000 | 116.56 | $ 181.83 |
| 1978 | 4,903,006 | 4.90 | 1978 | 0.91 | 2.56 | 1.65 | 41,845,000 | 117.17 | $ 193.33 |
| 1979 | 4,965,365 | 4.97 | 1979 | 1.18 | 2.98 | 1.8 | 43,358,000 | 114.52 | $ 206.14 |
| 1980 | 4,752,082 | 4.75 | 1980 | 1.59 | 3.68 | 2.09 | 44,114,000 | 107.72 | $ 225.14 |
| 1981 | 4,546,450 | 4.55 | 1981 | 1.98 | 4.29 | 2.31 | 44,924,000 | 101.20 | $ 233.78 |
| 1982 | 4,633,035 | 4.63 | 1982 | 2.46 | 5.17 | 2.71 | 44,667,000 | 103.72 | $ 281.09 |
| 1983 | 4,380,599 | 4.38 | 1983 | 2.59 | 6.06 | 3.47 | 45,153,000 | 97.02 | $ 336.65 |
| 1984 | 4,555,465 | 4.56 | 1984 | 2.66 | 6.12 | 3.46 | 45,670,000 | 99.75 | $ 345.13 |
| 1985 | 4,433,377 | 4.43 | 1985 | 2.51 | 6.12 | 3.61 | 46,331,000 | 95.69 | $ 345.44 |
| 1986 | 4,313,969 | 4.31 | 1986 | 1.94 | 5.83 | 3.89 | 46,877,000 | 92.03 | $ 357.99 |
| 1987 | 4,314,833 | 4.31 | 1987 | 1.67 | 5.54 | 3.87 | 47,710,444 | 90.44 | $ 349.99 |
| 1988 | 4,630,330 | 4.63 | 1988 | 1.69 | 5.47 | 3.78 | 48,474,449 | 95.52 | $ 361.07 |
| 1989 | 4,780,638 | 4.78 | 1989 | 1.69 | 5.64 | 3.95 | 49,309,593 | 96.95 | $ 382.96 |
| 1990 | 4,391,324 | 4.39 | 1990 | 1.71 | 5.8 | 4.09 | 50,187,178 | 87.50 | $ 357.87 |
| 1991 | 4,555,659 | 4.56 | 1991 | 1.64 | 5.82 | 4.18 | 51,593,206 | 88.30 | $ 369.09 |
| 1992 | 4,690,065 | 4.69 | 1992 | 1.74 | 5.89 | 4.15 | 52,331,397 | 89.62 | $ 371.93 |
| 1993 | 4,956,445 | 4.96 | 1993 | 2.04 | 6.16 | 4.12 | 52,535,411 | 94.34 | $ 388.70 |
| 1994 | 4,847,702 | 4.85 | 1994 | 1.85 | 6.41 | 4.56 | 53,392,557 | 90.79 | $ 414.02 |
| 1995 | 4,850,318 | 4.85 | 1995 | 1.55 | 6.06 | 4.51 | 54,322,179 | 89.29 | $ 402.69 |
| 1996 | 5,241,414 | 5.24 | 1996 | 2.17 | 6.34 | 4.17 | 55,263,673 | 94.84 | $ 395.50 |
| 1997 | 4,983,772 | 4.98 | 1997 | 2.32 | 6.94 | 4.62 | 56,186,958 | 88.70 | $ 409.79 |
| 1998 | 4,520,276 | 4.52 | 1998 | 1.96 | 6.82 | 4.86 | 57,321,746 | 78.86 | $ 383.25 |
| 1999 | 4,725,672 | 4.73 | 1999 | 2.19 | 6.69 | 4.5 | 58,223,229 | 81.16 | $ 365.24 |
| 2000 | 4,996,179 | 5.00 | 2000 | 3.68 | 7.76 | 4.08 | 59,252,728 | 84.32 | $ 344.02 |
| 2001 | 4,771,340 | 4.77 | 2001 | 4 | 9.63 | 5.63 | 60,286,364 | 79.14 | $ 445.58 |
| 2002 | 4,888,818 | 4.89 | 2002 | 2.95 | 7.89 | 4.94 | 61,107,254 | 80.00 | $ 395.22 |
| 2003 | 5,079,351 | 5.08 | 2003 | 4.88 | 9.63 | 4.75 | 61,871,450 | 82.10 | $ 389.95 |
| 2004 | 4,868,797 | 4.87 | 2004 | 5.46 | 10.75 | 5.29 | 62,496,134 | 77.91 | $ 412.12 |
| 2005 | 4,826,775 | 4.83 | 2005 | 7.33 | 12.7 | 5.37 | 63,616,827 | 75.87 | $ 407.44 |
| 2006 | 4,368,466 | 4.37 | 2006 | 6.39 | 13.73 | 7.34 | 64,166,280 | 68.08 | $ 499.71 |
| 2007 | 4,722,358 | 4.72 | 2007 | 6.25 | 13.08 | 6.83 | 64,964,769 | 72.69 | $ 496.48 |
| 2008 | 4,872,107 | 4.87 | 2008 | 7.96 | 13.89 | 5.93 | 65,253,954 | 74.66 | $ 442.76 |
| 2009 | 4,763,528 | 4.76 | 2009 | 3.71 | 11.98 | 8.27 | | | |

Source: Energy Information Administration, U.S. Department of Energy.
Total Consumption: http://tonto.eia.doe.gov/dnav/ng/ng_cons_sum_dcu_nus_m.htm
U.S. Wellhead Price: http://tonto.eia.doe.gov/dnav/ng/hist/n9190us3a.htm
Delivered Gas Price: http://tonto.eia.doe.gov/dnav/ng/hist/n3010us3A.htm
Number of Customers: http://tonto.eia.doe.gov/dnav/ng/hist/na1501_nus_8a.htm

**Chattanooga Gas Company**
**Updated CAPD Appliance Service Lives Analysis**

| | Residential Measures | | | | | Commercial Measures | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Assumptions** | **Free Programmable Thermostats** | **Low Income Weatherization** | **High Efficiency Furnace/Boiler 90% +** | **Tankless Water Heater** | **High Efficiency Storage Water Heater .67 EF** | **Food Service Equipment** | **High Efficiency Furnace/Boiler** | **Tankless Water Heater** | **High Efficiency Storage Water Heater** | **Booster Water Heater** |
| Measure Life - Company | 17 Years | 25 Years | 25 Years | 20 Years | 12 Years | 15 Years | 15 Years | 15 Years | 12 Years | 15 Years |
| National Home Builders Study (Attachment 156-1) | 35 Years | No Source Documentation Provided by Company | 15-20 Years Furnace (18 Years on p. 7); 21 Years Boiler | 20 Years | 10 Years | No Source Documentation Provided by Company | 15-20 Years Furnace (18 Years on p. 7); 21 Years Boiler | 20 Years | 10 Years | No Source Documentation Provided by Company |
| Energy Star (Attachment 156-2) | 15 Years | | | | | | | | | |
| Report to the Energy Trust of Oregon (Attachment 156-3) | | | 25 Years Furnace | | | | 25 Years Furnace | | | |
| Lawrence Berkley National Laboratory (Attachment 156-4) | | | 10-30 Years Furnace; 30 Years Boilers | | | | 10-30 Years Furnace; 30 Years Boilers | | | |
| U.S. Department of Energy (Attachment 156-5) | | | 12-24 Years Furnace; 20-30 Years Boiler | 20 Years | 10-15 Years | | 12-24 Years Furnace; 20-30 Years Boiler | | 10-15 Years | |
| Company's Tariff [1] | | | | | | 15 Years | 15 Years | 15 Years | 15 Years | 15 Years |
| Energy Star (independent website research) | 15 Years | | 18 Years Furnace; 20 Years Boiler | 15-20 Years | 13 Years | | | | | |

**Chattanooga Gas Company**
**Updated CAPD Appliance Service Lives Analysis**

| | Residential Measures | | | | | Commercial Measures | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Assumptions** | **Free Programmable Thermostats** | **Low Income Weatherization** | **High Efficiency Furnace/Boiler 90% +** | **Tankless Water Heater** | **High Efficiency Storage Water Heater .67 EF** | **Food Service Equipment** | **High Efficiency Furnace/Boiler** | **Tankless Water Heater** | **High Efficiency Storage Water Heater** | **Booster Water Heater** |
| Colorado Public Utilities Commission Order Docket No. 08A-366EG | 5 years [3] | Attic Insulation 20 Years; Air Sealing and Weather Stripping 10 Years; Wall Insulation 20 years | 18 Years | 20 Years | | | 18 Years | 20 Years | | |
| Montana Public Service Commission Order No. 6697c | 10 Years | | 15 Years | | 10 Years | | | | | |
| New Mexico Public Regulation Commission Case No. 07-000151-UT | Discontinued Because Savings Could not be Verified | | | | | 15 Years [4] | | | | |
| California Public Utility Commisson 2009-2011 Standards | 11 Years | 11 Years | 20 Years | 20 Years | 11 Years | 12 Years | 20 Years | 20 Years | 15 Years | 20 Years |
| **Recommended** | **10** | **20** | **18** | **20** | **10** | **15** | **15** | **15** | **10** | **15** |

Note: [1] The appliances being rebated here as is shown by the lives of the residential counterparts extends beyond the customers typical economic life as represented in the 15 years life for a commercial customer established in the Company's tariff for main and service extension. As such, a 15 year economic life was used for each of the remaining programs rather than the equipment life.
[2] Yellow represents the information the Company used to develop its assumptions. Blue represents data located in the Company's source documents but not used.
[3] Referred to as a setback thermostat.
[4] Assumed to be Fryers since Company testimony does not state.

Source: Response to Request CAPD 156; www.energystar.gov; New Mexico Public Regulation Commission Case No. 07-000151-UT; Montana Public Service Commission Order No. 6697c; Colorado Public Utilities Commission Order Docket No. 08A-366EG.

| Water Heater type | Efficiency (EF) | Installed Cost[1] | Yearly Energy Cost[2] | Life (Years) | Total Cost (Over 13 Years)[3] |
|---|---|---|---|---|---|
| Conventional gas storage | 0.60 | $850 | $350 | 13 | $5,394 |
| High-efficiency gas storage | 0.65 | $1,025 | $323 | 13 | $5,220 |
| Condensing gas storage | 0.86 | $2,000 | $244 | 13 | $5,170 |
| Conventional oil-fired storage | 0.55 | $1,400 | $654 | 8 | $11,299 |
| Minimum Efficiency electric storage | 0.90 | $750 | $463 | 13 | $6,769 |
| High-eff. electric storage | 0.95 | $820 | $439 | 13 | $6,528 |
| Demand gas (no pilot)[4] | 0.80 | $1,600 | $262 | 20 | $5,008 |
| Electric heat pump water heater | 2.20 | $1,660 | $190 | 13 | $4,125 |
| Solar with electric back-up | 1.20 | $4,800 | $175 | 20 | $7,072 |

1. Purchase costs include our best estimates of installation labor and do not include financial incentives.
2. Operating cost based on hot water needs for typical family of four and energy costs of 9.5¢/kWh for electricity, $1.40/therm for gas, $2.40/gallon for oil.
3. Future operating costs are neither discounted nor adjusted for inflation.
4. Estimates for tankless gas water heaters are based on the federal EF rating method, which may over-estimate the efficiency of tankless water heaters in houses.

Itron
Knowledge to Shape Your Future

# 2004/2005 Statewide Residential Retrofit Single-Family Energy Efficiency Rebate Evaluation

**CPUC-ID#:1115-04**

## Final, Report Only

Prepared for California's Investor-Owned Utilities:

The California Public Utilities Commission
San Francisco, California

Pacific Gas & Electric Company
San Francisco, California

San Diego Gas & Electric Company
San Diego, California

Southern California Edison
Rosemead, California

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October 2, 2007

Docket No. 09-00183
Exhibit DJN-10

2006-2008 Chattanooga Gas Energy Efficiency Rebate Kick Back Analysis

| | High Efficiency Furnace | Tankless Water Heater |
|---|---|---|
| **Energy Saving Customers Decreasing Consumption** | | |
| Customers Decreasing Load | 70 | 70 |
| Average Load Decrease in Therms | -225 | -174 |
| | | |
| **Kick Back Customers Increasing Consumption** | | |
| Customers Inecreasing Load | 21 | 28 |
| Average Load Increase in Therms | 224 | 100 |
| | | |
| **Average Results net of Kick Back** | | |
| **Customers** | **91** | **98** |
| **Average Load Decrease in Therms** | **-107** | **-88** |