BEFORE THE
STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

In the Matter of

Central Hudson Gas and Electric Corporation

Cases 09-E-0588 & 09-G-0589

November 2009

Prepared Testimony of:

STAFF FORECASTING PANEL

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Q. Please state your names and business addresses.
A. Our names are Mary Ann Sorrentino and Gregory P. Stella. Our business address is Three Empire State Plaza, Albany, NY 12223.
Q. Ms. Sorrentino, have you previously discussed your position, educational background and professional experience?
A. Yes, that information is included within the testimony of the Gas Rates Panel.
Q. Mr. Stella, by whom are you employed, and in what capacity?
A. I am employed by the New York State Department of Public Service (Department) as an Associate Economist.
Q. Have you previously filed testimony before the New York State Public Service Commission?
A. Yes, most recently in Cases 08-E-0887 and 08-G-0888.
Q. Mr. Stella, please briefly discuss your educational background and professional experience.
A. I hold a Ph.D. in Ecological Economics (2003) from Rensselaer Polytechnic Institute.

Previously, I received Bachelor of Science and Master of Arts degrees in Economics from the State University of New York at Albany. My initial work in the field of energy sales forecasting was as an employee of the New York State Energy Office, as part of the State's Energy Master Plan process. Prior to joining the Department in 2006, my most recent work involved teaching applied forecasting techniques as part of a course in Managerial Economics at SUNY Albany in 2004 and 2005.

Q. What is the purpose of this Panel's testimony?

A. We are presenting Staff's evaluations of the forecasts concerning electricity and gas customer counts and usages-per-customer made by Central Hudson Gas and Electric (Central Hudson or the Company), contained in the testimony filed by the Company's Forecasting & Rates Panel.

Q. Is this Panel sponsoring any exhibits?

A. Yes.

Exhibit ___(SFP-1) contains Company responses to Staff interrogatories DPS-24 through DPS-26 and

DPS-193, used in the development of this Panel's direct testimony.

Exhibit ___(SFP-2) contains the month-by-month outputs from Staff's models of electricity customers and sales for Rate Years ending in 2011, 2012, and 2013.

Exhibit ___(SFP-3) contains the month-by-month outputs from Staff's models of gas customers and sales for Rate Years ending in 2011, 2012, and 2013.

Exhibit ___(SFP-4) contains electricity customer and sales regression results.

Exhibit ___(SFP-5) contains gas customer and sales regression results.

Exhibit ___(SFP-6) shows results of Staff's statistical tests of various Company fixed-parameter assumptions.

Exhibit ___(SFP-7) shows estimated historical and projected future time paths for the non-constant intercept terms present in three of Staff's forecasting equations.

Exhibit ___(SFP-8) lists and graphs historical and projected values for service territory-specific GDP.

Q. Did you rely upon any information produced during the discovery phase of this proceeding?

A. Yes. We relied on responses to multiple interrogatory requests, particularly those supplying information on energy usage, elasticity assumptions, and a revision in 2008 to the Company's meter reading schedule. As explained above, details are contained within Exhibit SFP-1.

Q. Please preview your findings.

A. In broad terms, we find the Company's usage-per-customer forecasts to be of higher quality than its customer count forecasts, as we find the Company's customer count models' underpinnings questionable. While all models represent simplifications of reality, in our view important variables are omitted from each one of the Company's customer forecasting equations, suggesting these models are over-simplified.

Q. Please give a brief overview of the econometric models used by Central Hudson to produce its sales forecasts.

A. A majority of the Company's models combine customer and usage-per-customer projections to yield sales forecasts. The usage-per-customer equations are somewhat unique in that they rely on nonlinear combinations of key economic, demographic, and climatic variables to act as forecast drivers.

Q. Did the Staff Forecast Panel produce its sales forecasts using a similar approach?

A. Yes; all of Staff forecasts are the results of combining customer and usage per customer forecasts. A summary of Staff models' outputs are shown in Exhibits SFP-2 and SFP-3.

Q. Now, turning to the forecast drivers - which of your forecast drivers' projected values were identical to those used by the Company?

A. All indices reflecting Economy.com's forecasts of employment, income and demographic-related variables were identical. Similarly, none of the projections of engineering-based indices

embedded in the "X" variables supplied by Itron were changed. We also used the same projections for gas and electricity prices.

Q. Please discuss these "X" variables in more detail.

A. Regression coefficients of these "X" variables act as scaling factors to calibrate the models to the Central Hudson service territory, and have no direct economic interpretation. The only implied constraint is that if all the imposed elasticities have the correct sign, then the coefficient of the corresponding "X" variable would logically be positive.

Q. To which forecast drivers, if any, did you make modifications?

A. Our degree-day forecasts reflect the same ten-year averages used by the Company, in accordance with the Commission's Order setting rates in Cases 08-E-0887 and 08-G-0888. However, for estimation and forecasting purposes we assigned a value of zero to (historical and projected) out-of-season degree-days and used correspondingly constructed versions of Itron's

"X" variables. This was done to avoid imposing identical impacts of heating and cooling degree-days across all months.

Q. Did you also modify all the degree-day series in this manner when estimating Staff's models in the aforementioned cases?

A. Yes.

Q. Did you produce modified versions of any of the Company's sales-per-customer forecasting equations?

A. Yes.

Q. Please give an overview of your modifications to these equations.

A. We believe most of our modifications are more aptly described as refinements or minor improvements rather than corrections, their primary effect being decreases in error correlations. Our modifications, consisting of estimations of logarithms of sales as opposed to levels of sales, adjustments in modeled error terms, the inclusion/removal of monthly dummy variables, and alterations to elasticity assumptions all fall into this category.

Q. Please give the details of why Staff is using alternate values for certain elasticities.

A. As in Cases 08-E-0887 and 08-E-0888, we found point estimates for elasticities by using non-linear regression, modeling the elasticities directly as equation coefficients, and subsequently adjusted four of the values used by the Company based on our regression results: the income elasticity for electric and gas residential non-heating sales, and the output elasticity for gas commercial non-heating and gas OPA sales. Our point estimates are included within the regression results presented in Exhibits SFP-4 and SFP-5.

Q. Did you also make more significant changes - changes in structure - to the Company's equations?

A. Yes. In a number of equations we introduced a lagged dependent variable and/or a time-dependent intercept term.

Q. Why did you make these particular changes?

A. We made these changes for two reasons. First, we noted in our testimony in Cases 08-E-0887 and

08-E-0888 that we were "apprehensive" about the structure of Central Hudson's forecasting equations for commercial and industrial non-demand sales, as in both equations the coefficient of a key forecast driver was negative - and thus contrary to economic theory. We believed that with the passage of time and the associated movement of the estimation period these contrary results would disappear, as the underlying model structures appeared sound. And for one of the two equations - industrial non-demand - that result did, in fact, occur. However, it persisted in the Company's version of the commercial non-demand sales equation, and we were able to reverse the negative sign to agree with economic theory only with a change in structure. Second, in several equations we found a non-random error pattern across sub-intervals of the estimation period. We could not eliminate the pattern by including either a conventional intercept term or a simple time trend in the equations. Therefore, a time-varying (random walk) intercept exists in our

version of the sales equations for industrial non-demand, electric commercial demand and gas industrial.

Q. Are you presenting statistical evidence that justifies all these changes?

A. Yes. Together, Exhibits SFP-6 and SFP-7 contain the results of seven statistical tests. Each of the four changed elasticity values is supported by the result of a Wald test. Each of the three usages of a time-varying intercept in place of a fixed intercept is supported by a Likelihood Ratio test result. The estimated time paths for each intercept are shown in separate graphs in Exhibit SFP-7.

Q. Please summarize how the two sets of electricity usage-per-customer projections compare for the Rate Year ending June 30, 2011.

A. There are eight pairs of electricity usage-per-customer projections. The pair-wise differences vary widely in size, but a majority are less than the respective Staff equation's margin of error and/or small in absolute terms (under 1 percent), and hence considered insignificant.

Differences for three classes stand out: commercial non-demand, industrial demand, and industrial non-demand. Here, Staff's numbers range from 6 to 25 percent higher than their Company counterparts.

Q. Can you identify what causes differences of this magnitude?

A. We believe so. As noted above, the Company's commercial non-demand equation contains an incorrectly-signed forecast driver, causing its usage-per-customer projections to fall concurrent with the projected economic recovery. For the two industrial equations, in both instances the Company's specification includes a negatively-signed time trend term. A time trend is not present in Staff's versions.

Q. Is a negatively-signed time trend unexpected?

A. No. Exhibit FRP-8 (Sheets 7 and 8) from the Company's Forecasting & Rates Panel shows actual industrial mWh usage per customer declining between 2002 and 2008 despite service area-specific GDP - calculated by the Company from Economy.com data and shown in Staff Exhibit

SFP-8 - showing a general upward trend over the same period. (It is only with the advent of the current recession that this driver starts declining in value.)

Q. What, then, accounts for the cessation/reversal of the downward usage-per-customer trends in Staff's projections?

A. The combination of our random walk intercepts keeping their final estimated levels throughout the forecast period, plus the projected economic recovery. All other things equal, changes in GDP should positively translate into changes in usage. And as also shown in Exhibit SFP-8, GDP was expected to "bottom out" in August, 2009 and then proceed on a long, slow upward path; the forecast has GDP reaching its pre-recession level at the end of 2011. (Similarly, total employment also follows this pattern, albeit with a few months' lag, only reaching its pre-recession level in early 2012.)

Q. Please summarize how the two sets of gas usage-per-customer projections compared for the Rate Year ending June 30, 2011.

A. There are six pairs of gas usage-per-customer projections. With the exception of industrial, differences from Company forecasts are small; they range from -2 percent to +1 percent. For industrial, Staff's projection is more than 8 percent below the Company's.

Q. Can you identify what causes the difference in the two industrial class forecasts to be so relatively large?

A. Yes. As noted above, gas industrial usage per customer is one of three equations where Staff employs a time-varying intercept term. As can be seen from Exhibit SFP-7, the estimated value of the intercept term is much lower at the end of the estimation period than overall, and Staff's forecast directly reflects the lower end-of-period value. In the Company's equation the overall value is (indirectly) reflected, as the Company modeled the downward shift through the use of an autoregressive error term.

Q. Please now give a brief overview of the equations used by Central Hudson to produce its customer forecasts.

A. The Company's customer forecasting equations employ common specifications - the various projections are driven by households, population, employment, or past values (when exponential smoothing is used).

Q. Did you find the structure of the Company's customer forecasting equations acceptable?

A. No. We believe all the Company's customer forecasting equations are misspecified, as none correctly model the meter reading schedule revision that took place in November 2008. Specifically, the Company revised its meter-reading schedules applicable to the period November 2008 through January 2009, and the Company expects these operational conditions to continue during the forecast period.

Q. How does this revision lead to the Company's customer forecasting equations being misspecified?

A. The information contained in the replies to Staff Interrogatories 25 and 193 indicates that the revision should have had no impact on the total number of customer months billed by the

Company over the course of a given rate year. This revision caused a shift in customers among the months of November, December, and January, but with no expected aggregate net impact. Thus, technically correct modeling of this phenomenon requires a separate dummy variable for each of these three months (starting annually in November 2008), with the combined impact on customer counts constrained to zero, as Staff has done.

Q. How do the Company's customer forecasting equations actually reflect this revision?

A. The residential electric non-heating and residential gas heating customer equations capture only statistically significant drops in January 2009 customer numbers (that are subsequently carried forward in the Company's forecasts). The commercial gas heating customer forecasting equation contains a built-in drop for the combined November/December/January time period (versus the same period in 2008-09), by means of a December 2008 increase modeled solely as a one-time event.

Q. What about the remaining rate classes?
A. For the other rate classes the change was ignored; as they almost always involve only combinations of offsetting statistically insignificant shifts, these misspecifications impact (slightly) forecasts of individual months within the November-January period but have little if any overall impact.
Q. Did you test the validity of your combined-constraint assumption during the course of estimating Staff's models?
A. Yes. With the exception of the electric residential non-heating customers equation, the combined impact of the three dummy variables was always statistically insignificant from zero. For that particular equation the individual impact for the month of November, 2008 was negative, which was impossible to attribute to the revision; the constraint was therefore imposed simultaneously with an outlier dummy for that month.
Q. Please give a synopsis of how Staff's and the Company's respective electricity and gas

customer count projections compare for the Rate Year ending June 30, 2011.

A. As noted above, the pattern of monthly figures for November-January periods differs due to the different accountings of the Company's November 2008 change in its meter reading schedule. The more substantial differences present in the two (electric and gas) residential heating customer classes, and the commercial heat class (gas), are the result of the inconsistent treatments of aggregate November 2008-January 2009 changes vis-à-vis the forecast period. (Impacts on a service class basis are described within the respective testimonies of Staff's Electric Rates Panel and Staff's Gas Rates Panel.)

Q. What is the Panel's recommendation with respect to the overall sales forecasts?

A. We recommend the Commission adopt Staff's sales projections in their entirety for both electricity and gas.

Q. Does this conclude the Panel's testimony at this time?

A. Yes, it does.