HINCKLEY
ALLEN

100 Westminster Street, Suite 1500
Providence, RI 02903-2319
p: 401-274-2000 f: 401-277-9600
hinckleyallen.com

Adam M. Ramos
Direct Dial 401-457-5164
aramos@hinckleyallen.com

October 8, 2015

VIA ELECTRONIC MAIL and HAND DELIVERY

Ms. Luly E. Massaro, Commission Clerk
Rhode Island Public Utilities Commission
89 Jefferson Boulevard
Warwick, RI 02888

Re: ***2015 Gas Cost Recovery Filing – Docket No. 4576***

Dear Ms. Massaro:

Enclosed for filing in the above-referenced matter are an original and nine (9) copies of The Narragansett Electric Company d/b/a National Grid's ("National Grid" or the "Company") Responses to the Rhode Island Division of Public Utilities and Carriers' (the "Division") Third Set of Data Requests, issued on September 18, 2015.

Thank you for your attention to this filing. If you have any questions, please contact me at (401) 457-5164.

Very truly yours,

Adam M. Ramos

AMR:cw
Enclosures

cc: Docket 4576 Service List (via electronic mail)

Docket No. 4576 – National Grid – 2015 Annual Gas Cost Recovery Filing ("GCR") - Service List as of 9/18/15

Name/Address	E-mail	Phone
Jennifer Brooks Hutchinson, Esq. National Grid 280 Melrose St. Providence, RI 02907	Jennifer.hutchinson@nationalgrid.com; Celia.obrien@nationalgrid.com; Joanne.scanlon@nationalgrid.com;	401-784-7288
Ann E. Leary Elizabeth D. Arangio Stephen A. McCauley National Grid 40 Sylvan Road Waltham, MA 02541	Ann.Leary@nationalgrid.com; Elizabeth.Arangio@nationalgrid.com; Stephen.Mccauley@nationalgrid.com; Theodore.poe@nationalgrid.com	
Leo Wold, Esq. Dept. of Attorney General 150 South Main St. Providence RI 02903	Lwold@riag.ri.gov; Steve.scialabba@dpuc.ri.gov; dmacrae@riag.ri.gov; Jmunoz@riag.ri.gov ;	401-222-2424
Bruce Oliver Revilo Hill Associates 7103 Laketree Drive Fairfax Station, VA 22039	Boliver.rha@verizon.net;	703-569-6480
File an original & nine (9) copies w/: Luly E. Massaro, Commission Clerk Public Utilities Commission 89 Jefferson Blvd. Warwick RI 02888	Luly.massaro@puc.ri.gov; Patricia.lucarelli@puc.ri.gov; Sharon.ColbyCamara@puc.ri.gov; Todd.bianco@puc.ri.gov;	401-780-2107
Office of Energy Resources Christopher Kearns Nicholas Ucci	Christopher.Kearns@energy.ri.gov; Nicholas.ucci@energy.ri.gov;	

Division 3-1

Request:

Instruction: Each request for workpapers should be understood to include a request for all electronic spreadsheet files with all cell formulas and cell references intact.

Re: The Direct Testimony of witness Poe, filed September 1, 2015.

Re: The September 1, 2015, Direct Testimony of witness Theodore Poe at page 3, lines 13-19, please:

a. Provide the full detail of the Company's most recent ten-year forecasts of annual sales, throughput, and numbers of customers;

b. Provide the regression model used for estimating wholesale sendout requirements;

c. Detail the differences, if any, in the model(s) and data inputs used to estimate forecasted sales, throughput, and numbers of customers for Rhode Island and the methods used for the Company's service in other jurisdictions;

d. Detail the data and procedures used to compute weather normalized sales and throughput for Rhode Island. Additionally, please identify any differences in the data and procedures used by the Company to assess weather normal sales and throughput requirements in this proceeding and the methods that were used for the same purposes in prior forecasting efforts over the last five years;

e. Detail the data and methods used to determine the design of each of the Company's weather planning standards for Rhode Island;

f. Document the methodology used to determine wholesale customer requirements under design winter conditions;

g. Identify each wholesale customer in Rhode Island for which design winter requirements have been estimated.

Response:

a. Please refer to the live spreadsheet identified as Attachment DIV 3-1 (a), which is being provided on CD-ROM, for the monthly forecasted volumes and meter counts by rate

Division 3-1, page 2

code. Therein, the Company has included a tab associating the rate codes with their descriptions.

b. The Company's regression equation methodology for translating its retail demand forecast into its wholesale citygate requirements forecast was most recently documented in Section III.C.1 ("Regression Equation") in its March 10, 2014 Gas Long-Range Resource and Requirements Plan submission.

Because a significant portion of the Company's sendout is due to space heating usage and space heating only occurs when average air temperatures fall below a certain level, the Company's segmented regression equation model serves as an excellent starting point for modeling the daily relationship between sendout and heating degree days (HDD). Linear modeling of sendout is appropriate because the Company has not observed any non-linear characteristics in sendout at cold temperatures.

In the Company's equations, Intercept is the MMBtu sendout predicted at HDD=0, Slope1 is the MMBtu/HDD usage below the Breakpoint HDD level, Slope2 is the incremental MMBtu/HDD usage above the Breakpoint HDD level, the Standard Error is expressed in MMBtus, and the Breakpoint HDD is the HDD value at which spaceheating equipment is observed to turn on. The signs of the Slope1 and Slope2 coefficients (positive) imply that as temperatures get colder and HDD increases in value, then sendout will increase, which corresponds with the Company's observations.

Based on observations of daily sendout, the Company has observed that weekday and weekend sendout requirements are different at similar HDD levels. The Company's regression equations include a second independent variable, a weekday/weekend dummy variable, set to zero for Mondays through Thursdays, 1 on Fridays and Sundays, and 2 on Saturdays. The sign of the coefficient (negative) implies that, for a given HDD level, loads will be lower on Friday-Sunday versus Monday-Thursday (weekend vs. workweek).

Finally, the Company has observed a correlation between lagged temperature and the residuals of the above equation, and it added a third independent variable: the difference between HDD on day *t* and mean of the HDD on day *t-1* and day *t-2*. The differences were used in lieu of the actual lagged values to avoid correlation among the independent variables. The underlying theory of this analysis is that heating requirements increase as two consecutive days of cold weather occur, which cools down structures to a greater degree than would be experienced on a single day. The introduction of the third independent variable added another incremental improvement in the adjusted R^2 of the equations. The sign of the coefficient (negative) implies that, if a day is colder than the average of the previous two days, the increase in sendout will be somewhat lower than what would be forecast without the coefficient, and vice versa.

The table below shows the 2014/15 springboard regression coefficients for the Company's four divisions. The functional form of the equation, in pseudo code, is then:

```
Sendout = Intercept Coefficient +
    Weekend Dummy Coefficient * Weekend Dummy Variable +
    Slope1 Coefficient * min(HDDt, Breakpoint HDD) +
    if(HDDt<=Breakpoint HDD) {0} else {(Slope1 Coefficient
      + Slope2 Coefficient) *
      (HDDt - Breakpoint HDD)} +
    Lagged Delta HDD Coefficient * (HDDt - average(HDDt-1, HDDt-2)
```

As seen in this table, the adjusted R-squared values for all 2014/15 regressions are all in the range of 0.96 to 0.98, and all of the t-statistics of the independent variables are greater than 2.0 except for the Valley Slope1 variable which was 1.0, indicating that all of these variables are significant to the explanatory power of the equation.

Division	Intercept	Slope1	Slope2	Weekend	Lagged Delta HDD	Standard Error	Adjusted R^2	Breakpoint HDD
Providence and Bristol/Warren	44,440.80	873.80	3,997.00	-3,183.40	-740.30	8,863	0.9841	7.68
Valley	7,950.54	51.33	1,037.69	-1,276.16	-201.71	3,238	0.9581	6.39
Westerly	1,133.11	23.61	78.94	-202.57	-16.26	197	0.9803	11.02

Segmented Regression Results for Throughput vs. HDD and Weekend and Lagged Delta HDD

c. In all of National Grid's jurisdictions, it uses billing data by rate code as the dependent variables in its annual forecasts. It uses Moody's economic data and DOE/EIA price data forecasts as independent variables. Weather data originates from the National Weather Service. The modeling methodology used for its Rhode Island and New York jurisdictions is the same; Massachusetts requires National Grid to use a slightly different methodology, however it is still an econometric forecast by rate code.

d. Since 2010 through its 2012 Long Range Plan submission, the Company prepared a retail sales forecast using billing data. The Company would then produce its wholesale (citygate) volume forecast by adding the incremental retail volume forecast to its springboard wholesale regression equation of the most recent 12-month period.

Prepared by or under the supervision of: Theodore Poe, Jr.

Since 2012, the Company has unified its forecasting methodology to take its retail sales forecast, align it to calendar months through its unbilled sales analysis, added unaccounted-for gas (UFG) volumes, and used its springboard equation to distribute the resulting monthly volumes to the daily level for supply planning purposes. The Company's retail demand forecasting methodology was most recently documented in Section III.B ("Forecast of Retail Demand ('Demand Forecast')") in its March 10, 2014 Gas Long-Range Resource and Requirements Plan submission.
The Company uses its monthly customer billing data (volume and number of customers) to define the dependent variables in its econometric models. The Company develops models of meter count and use per customer (volume divided by meter count). The billing data was modeled at the rate code level for the various classes of customers (residential heat, residential non-heat, commercial and / industrial heat, commercial and/ industrial non-heat, etc.). Additionally capacity-exempt customer classes were modeled separately by rate code.

The Company uses historical economic data, demographic data from Moody's, a time trend variable, actual HDD, actual Billing Degree Days, as well as natural gas and oil prices from the Department Of Energy/Energy Information Administration (DOE/EIA) as independent variables to estimate statistically valid econometric equations for each class.

The Company then reduces the results of its statistical forecast models to account for the incremental impact of the energy efficiency programs sponsored by the Company. The Company subtracted only the incremental savings from the programs that are not embedded in the historical data used to derive the statistical models, because these savings are exogenous to the modeling effort.

Over the past five years, the Company has consistently relied on its billing system data, its external economic consulting firm for economic data, the DOE/EIA for price data, and its external weather forecasting firm for weather data.

e. The Company's planning standards represent the defined weather conditions and consequent sendout requirement that must be met by the Company's resource portfolio. The Company's design standards methodology was most recently documented in Section III.E.2 ("Design Year and Design Day Planning Standards") in its March 10, 2014 Gas Long-Range Resource and Requirements Plan submission.

The Company maintains a design day standard for planning purposes to identify the amount of pipeline daily deliverability plus LNG vaporization that will be required to provide continuous service under all reasonable weather conditions. In its 2014 Gas Long-Range Resource and Requirements Plan submission, the Company identified 68 HDD as its design day standard based upon its cost/benefit analysis comparing the cost of maintaining a range of resources within its portfolio to the benefit of avoiding freeze-up damages and relight costs.

The Company maintains a design year standard for planning purposes to identify the amount of seasonal supplies of natural gas that will be required to provide continuous service under all reasonable weather conditions. In its 2014 Gas Long-Range Resource and Requirements Plan submission, the Company identified 6,168 HDD as its design year standard based upon its cost/benefit analysis comparing the cost of maintaining a range of resources within its portfolio to the benefit of avoiding service disruptions and consequent economic losses, principally to its commercial and industrial customers.

f. Upon completion of the development of the annual retail demand forecast, the Company develops a model of the relationship, using its most recent historical data, between the difference between retail and wholesale volumes versus the difference between calendar month heating degree days and billing degree days. This model is then used to forecast unbilled sales and adjust the lagged retail forecast to an unlagged retail forecast. Using the most recent 12 months UFG percentage, the unlagged retail historical data is inflated to the wholesale level and aligned with the historical wholesale purchases. The unbilled model and UFG percentage are applied to the normal weather forecast of retail volumes to generate a wholesale-level monthly volume forecast. The Company's daily regression equation (see DIV 3-1 (b) above) and normal forecasted heating degree days are then used to distribute the monthly forecasted volumes to the daily level by service territory. Daily design weather forecasted requirements are then calculated using the same daily regression equation and design daily heating degree days to distribute the monthly forecasted volumes to the daily level.

g. In producing its annual retail econometric forecast, the Company models each individual rate class. It does not model customers individually. Estimates of individual customer design day requirements are maintained within the Company's Customer Choice database system.

Prepared by or under the supervision of: Theodore Poe, Jr.

Division 3-2

Request:

Re: the September 1, 2015, Direct Testimony of witness Theodore Poe at page 4, lines 1-8, please detail all year-to-year changes in forecast gas use per customer by rate classification contained within the Company's most recent ten-year forecast, and provide the Company's explanation for any observable changes of more than 10% over the forecast period.

Response:

Attachment DIV 3-1 (a) to the Company's response to Division 3-1 also contains a tab calculating the forecasted use per customer by rate code based on the forecasts of volume and meter count, as well as the total percentage change from PY2016 to PY2024.

The use per customer for Residential Non-heating Sales, representing 1.7 percent of volumes, is forecasted to drop by 41.6 percent, driven by migration from non-heating to heating service.

The use per customer for C&I Low XL Sales, representing 0.2 percent of volumes, is forecasted to drop by 100 percent as its meter count is projected to drop to zero in the forecast period.

The use per customer for C&I High Lg Sales, representing 0.5 percent of volumes, is forecasted to grow by 15.1 percent. While its meter count drops from 32 in PY2016 to 24 in PY2024, its volumes are projected to decline from 1,993,597 therms to 1,749,828 therms.

The use per customer for C&I High XL Sales, representing 0.7 percent of volumes, is forecasted to grow by 54.3 percent. While its meter count drops from 7 in PY2016 to 3 in PY2024, its volumes are projected to decline from 2,853,288 therms to 2,199,763 therms.

The uses per customer for all other rate groups are projected to be within the +/- 10 percent range over the period from PY2016 to PY2024.

Prepared by or under the supervision of: Theodore E. Poe, Jr.

Division 3-3

Request:

Re: the September 1, 2015, Direct Testimony of witness Theodore Poe at page 4, lines 10-12, please document the Company's adjustment of its retail forecast to account for billing lags.

Response:

The Company's method for adjusting its lagged retail volume forecast and correcting for unbilled volumes was described in the Company's response to Division 3-1, part (f). Upon completion of the development of the annual retail demand forecast, the Company develops a model of the relationship between the difference between historical retail and wholesale volumes versus the difference between historical calendar month heating degree days and billing degree days. This model is then used to forecast unbilled sales and adjust the lagged retail forecast to an unlagged retail forecast.

Prepared by or under the supervision of: Theodore E. Poe, Jr.

Division 3-4

Request:

Re: the September 1, 2015, Direct Testimony of witness Theodore Poe at page 5. The tables on the referenced page which show forecasted throughput volumes for 2015/16 and for 2014/15 appear to reflect year over year increases in forecasted Commercial/Industrial Sales and forecasted Commercial/ Industrial Transportation volumes of greater than 11% while forecasted Residential service volumes have declined. Please:

a. Explain why this Commission should find such large increases in forecasted Commercial/Industrial service requirements for Rhode Island believable; and

b. Provide the data regarding economic activity, employment, and other variables upon which the Company relies upon to support the reasonableness of its forecasted increase in forecasted Commercial/Industrial gas service requirements for Rhode Island.

Response:

a. The 11 percent increase in Commercial/Industrial volumes is driven by the increase in use per customer observed over the past two planning years. The slight decrease in Residential volumes is in line with the Company's long-term forecast for the Residential market.

   As the Company has discussed in its response to Division 3-1, part (d), the Company's annual retail forecast is based on analysis of its historical use per customer and meter count by rate code. The Company's forecast presented in Docket 4520 for 2014/15 (pre-filed testimony of Theodore E. Poe, Jr., page 5, lines 2-4) was based on Company billing data through February 2014. The Company's forecast presented in the instant docket for 2015/16 (pre-filed testimony of Mr. Poe, page 5, line 1) was based on Company billing data through February 2015.

   Attachment DIV 3-4-A summarizes the use per customer, meter count, and resulting volume data by planning year (November-October) for PY2011 through PY 2016 for the three categories: Residential Sales, Commercial/Industrial Sales, and Commercial/Industrial Transportation. Attachment DIV 3-4-B is the Excel spreadsheet with these charts and the underlying data. Attachment DIV 3-4-B is being provided separately on CD-ROM.

Division 3-4, page 2

For the 2014Q2 forecast (blue lines), actual historical data are from PY2011 through the first four months of PY2014; forecast data are from the final eight months of PY2014 through PY 2016. The historical data reflects the warmer-than-normal winter of PY2012, the near-normal winter of PY 2013, the colder-than-normal winter of PY2014, and the normal forecast of PY 2015 and PY2016.

For the 2015Q2 forecast (black lines), actual historical data are from PY2011 through the first four months of PY2015; forecast data are from the final eight months of PY2015 through PY 2016. The historical data reflects the warmer-than-normal winter of PY2012, the near-normal winter of PY 2013, the colder-than-normal winters of PY2014 and PY 2015, and the normal forecast PY2016.

Use Per Customer (UPC)

For both the 2014Q2 and the 2015Q2 forecast, the Residential use per customer data and forecasts are very similar.

For the Commercial/Industrial Sales category, the 2014Q2 forecast (blue line) showed a higher UPC expected for PY2014 with a return to previous levels under normal weather in PY2015 and PY2016. The analysis performed for the 2015Q2 forecast showed, in fact, a significantly higher jump in annual UPC through PY2014 and into PY2015. This higher UPC is forecast to continue into PY2016.

For the Commercial/Industrial Transportation category, the 2014Q2 forecast (blue line) also showed a higher UPC expected for PY2014 with a return to previous levels under normal weather in PY2015 and PY2016. The analysis performed for the 2015Q2 forecast showed, in fact, a higher annual UPC through PY2014 which continued into PY2015. This higher UPC is forecast to return to the levels of PY2014 in PY2016.

Meter Count

In preparation for its 2015Q2 forecast, the Company reanalyzed its historical billing data and clarified its definition of the meters it includes in its forecast as open, active, and flowing meters. The result was to reduce the number of residential meters in its analysis by approximately 5,000 meters per year and the number of Commercial/Industrial Sales meters by approximately 500 meters per year. The number of Commercial/Industrial Transportation meters was not significantly affected by the reanalysis.

Prepared by or under the supervision of: Theodore Poe, Jr.

Division 3-4, page 3

Volume (UPC times Meter Count)

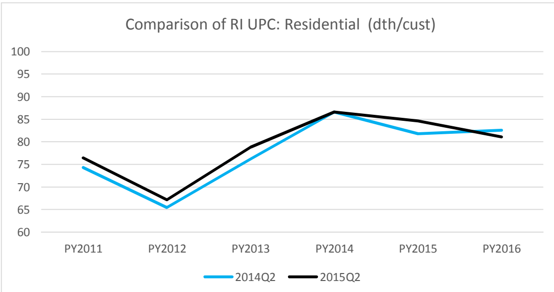
For both the 2014Q2 and the 2015Q2 forecast, the Residential volume data and forecasts are very similar.

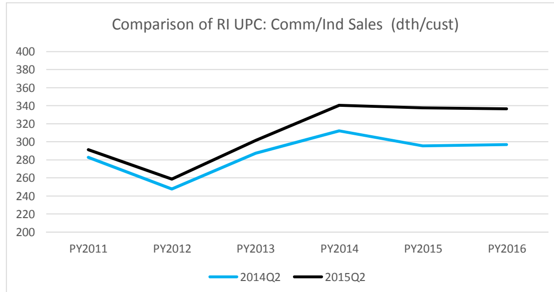
The difference between the 2014Q2 and 2015Q2 forecasts of Commercial/Industrial Sales are primarily driven by the increased use per customer observations in the Company's actual historical data from the two very cold winters of PY2014 and PY2015. While the UPC increases are coincidental with the cold winters, they could be caused by either the severity of the weather, increased economic activity, or both.

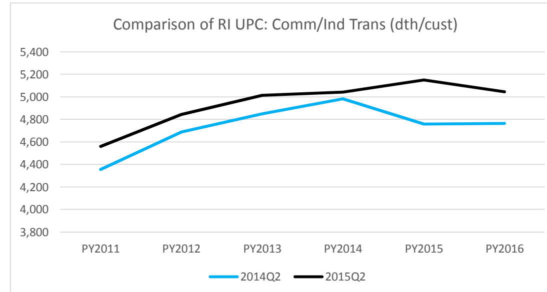
Similarly, the difference between the 2014Q2 and 2015Q2 forecasts of Commercial/Industrial Transportation are primarily driven by the increased use per customer observations in the Company's actual historical data from the two very cold winters of PY2014 and PY2015. While the UPC increases are coincidental with the cold winters, they could be caused by either the severity of the weather, increased economic activity, or both.

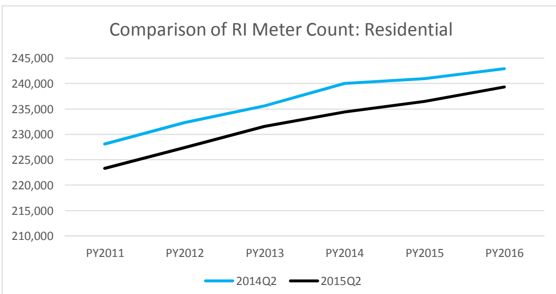
b. Please refer to Attachment DIV 2-8-b of the Company's response to Division 2-8 for the historical and forecast economic data used in the Company's 2015Q2 forecast.

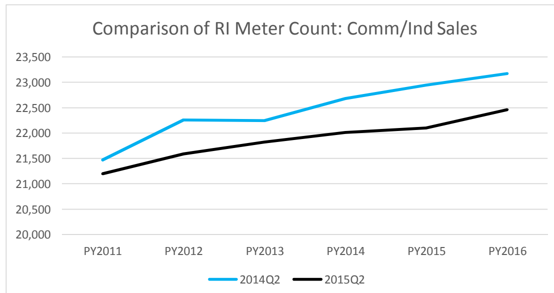
Prepared by or under the supervision of: Theodore Poe, Jr.

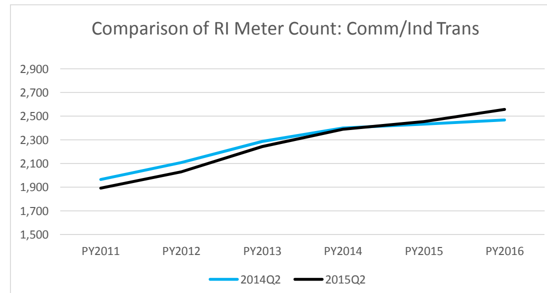

Comparison of RI UPC: Residential (dth/cust)
100
95
90
85
80
75
70
65
60
PY2011
PY2012
PY2013
PY2014
PY2015
PY2016
2014Q2
2015Q2

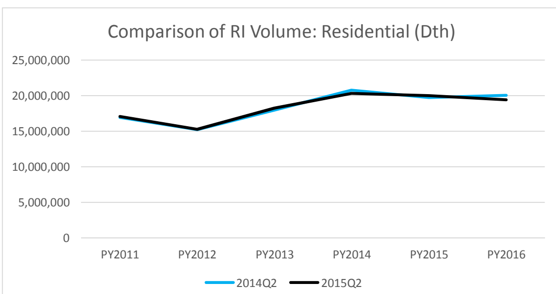

Comparison of RI UPC: Comm/Ind Sales (dth/cust)
400
380
360
340
320
300
280
260
240
220
200
PY2011
PY2012
PY2013
PY2014
PY2015
PY2016
2014Q2
2015Q2

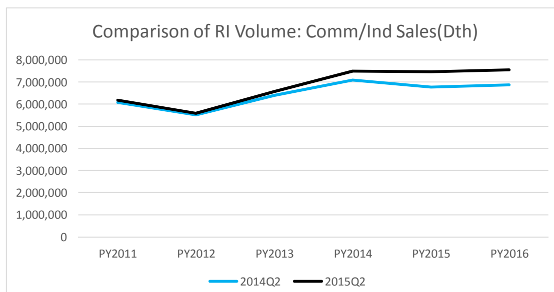

Comparison of RI UPC: Comm/Ind Trans (dth/cust)
5,400
5,200
5,000
4,800
4,600
4,400
4,200
4,000
3,800
PY2011
PY2012
PY2013
PY2014
PY2015
PY2016
2014Q2
2015Q2

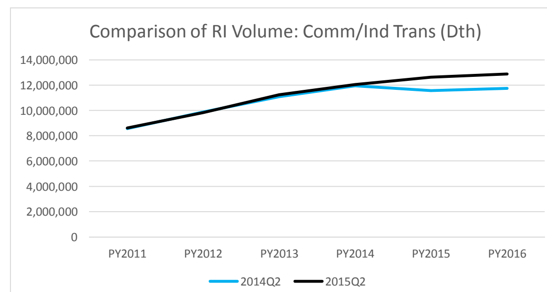

Comparison of RI Meter Count: Residential
245,000
240,000
235,000
230,000
225,000
220,000
215,000
210,000
PY2011
PY2012
PY2013
PY2014
PY2015
PY2016
2014Q2
2015Q2


Comparison of RI Meter Count: Comm/Ind Sales
23,500
23,000
22,500
22,000
21,500
21,000
20,500
20,000
PY2011
PY2012
PY2013
PY2014
PY2015
PY2016
2014Q2
2015Q2


Comparison of RI Meter Count: Comm/Ind Trans
2,900
2,700
2,500
2,300
2,100
1,900
1,700
1,500
PY2011
PY2012
PY2013
PY2014
PY2015
PY2016
2014Q2
2015Q2


Comparison of RI Volume: Residential (Dth)
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
PY2011
PY2012
PY2013
PY2014
PY2015
PY2016
2014Q2
2015Q2


Comparison of RI Volume: Comm/Ind Sales(Dth)
8,000,000
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
PY2011
PY2012
PY2013
PY2014
PY2015
PY2016
2014Q2
2015Q2


Comparison of RI Volume: Comm/Ind Trans (Dth)
14,000,000
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
PY2011
PY2012
PY2013
PY2014
PY2015
PY2016
2014Q2
2015Q2