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December 30, 2014

Via Email (12/30/14)
and Hand-Delivery (12/31/14)

The Honorable Earl Taylor
Executive Director
Tennessee Regulatory Authority
c/o Sharla Dillon
502 Deaderick Street, Fourth Floor
Nashville, Tennessee 37243

Re: ***Petition of Piedmont Natural Gas, Inc. for Approval of a CNG Infrastructure Rider to Its Approved Rate Schedules and Service Regulations***
Dockets No. 14-00086 and 14-00087

Dear Mr. Taylor:

Enclosed please find an original and five (5) copies of Piedmont Natural Gas Company Inc.'s ("Piedmont") Supplemental Responses to Requests 18 and 19 of Tennessee Fuel and Convenience Store Association's ("TFCA") first set of Discovery Requests.

This material is also being filed today by way of email to the Tennessee Regulatory Authority docket manager, Sharla Dillon. Please file the original and four copies and stamp the additional copy as "filed." Then please return the stamped copy to me by way of our courier.

Should you have any questions concerning this matter, please do not hesitate to contact me at the email address or telephone number listed above.

With kindest regards, I remain

Very truly yours,

R. Dale Grimes

Enclosures

cc: Melvin Malone, Esq. (via email)
Wayne Irvin, Esq. (via email)
Sharla Dillon (via email)

PIEDMONT NATURAL GAS COMPANY, INC.
CNG IR
TRA DOCKET NOS. 14-00086 & 14-00087
SUPPLEMENTAL RESPONSES TO
TENNESSEE FUEL AND CONVENIENCE STORE ASSOCIATION
DISCOVERY REQUEST NO. 1
Date Issued: October 14, 2014

18. To the extent not previously provided, please provide electronic copies (on CD) of all tables, charts, diagrams, schedules, and exhibits (collectively, "Exhibits") contained in the testimony of Pia K. Powers of Piedmont. Please include all workpapers, schedules, underlying computations and supporting documentation used and/or relied upon by Witness Powers in the preparation of her testimony, including the preparation of all Exhibits. Please provide all electronic spreadsheets with cell formulas, cell references, macros and VBA code intact.

Response: See the attachments provided in response to Items 5 and 12 of this data request.

Response provided by Piedmont Natural Gas on October 23, 2014.

Supplemental Response: The attached Order from Piedmont's rate case in TRA Docket No. 11-00144 was used in the preparation of Witness Powers' rebuttal testimony.

Response provided by Piedmont Natural Gas on December 30, 2014

BEFORE THE TENNESSEE REGULATORY AUTHORITY

NASHVILLE, TENNESSEE

IN RE:	)	
	)	
PETITION OF PIEDMONT NATURAL GAS	)	**DOCKET NO.**
COMPANY, INC. FOR AN ADJUSTMENT TO	)	**11-00144**
ITS RATES, APPROVAL OF CHANGES TO	)	
ITS RATE DESIGN, AMORTIZATION OF	)	
CERTAIN DEFERRED ASSETS, APPROVAL	)	
OF NEW DEPRECIATION RATES,	)	
APPROVAL OF REVISED TARIFFS AND	)	
SERVICE REGULATIONS AND APPROVAL	)	
OF A NEW ENERGY EFFICIENCY	)	
PROGRAM AND GTI FUNDING	)	

ORDER APPROVING SETTLEMENT AGREEMENT

This matter came before the Tennessee Regulatory Authority ("Authority" or "TRA"), at a regularly scheduled Authority Conference held on January 23, 2012, for consideration of the joint *Stipulation and Settlement Agreement between Piedmont Natural Gas Company, Inc. and the Consumer Advocate and Protection Division* ("*Stipulation and Settlement Agreement*") (attached hereto as Exhibit 1), as filed by Piedmont Natural Gas Company, Inc. ("Piedmont" or the "Company") and the Consumer Advocate and Protection Division ("Consumer Advocate" or "CAPD") on December 22, 2011.

BACKGROUND

Piedmont's *Petition*

Piedmont filed its *Petition of Piedmont Natural Gas Company, Inc.* ("Piedmont" or the "Company") *for an Adjustment to its Rates, Approval of Changes to its Rate Design, Amortization of Certain Deferred Assets, Approval of New Depreciation Rates, Approval of Revised Tariffs and Service Regulations and Approval of a New Energy Efficiency Program and*

GTI Funding ("*Petition*") together with a proposed tariff for a rate increase effective on September 2, 2011. In its *Petition*, Piedmont requested that it be allowed to earn an overall rate of return of 8.53% and an 11.25% return on equity during the attrition year ending February 28, 2013. In support of its *Petition*, Piedmont filed sworn testimony, together with exhibits, of the following witnesses: Thomas E. Skains, President and Chief Executive Officer of Piedmont Natural Gas Company; David Carpenter, Director of Rates of Piedmont Natural Gas Company; Rooney Myers, Vice President, Engineering and Operations Services; Pia Powers, Manager of Regulatory Affairs; David R. Dzuricky, Senior Vice President and Chief Financial Officer; Daniel P. Yardley, Principal at Yardley & Associates; Donald A. Murray, Ph.D., Economist with C. H. Guernsey & Company, Oklahoma City, Oklahoma; Rhonda Watts, Senior Consultant, Alliance Consulting Group; and Gary D. Shambaugh, Principal and Director at AUS Consultants, Inc.

The Consumer Advocate filed its *Petition to Intervene* on September 21, 2011. Piedmont's *Petition* was considered at a regularly scheduled Authority Conference held on September 12, 2011, and the panel voted unanimously to convene a contested case and appointed Chairman Kenneth C. Hill as the Hearing Officer in this proceeding for the purpose of preparing this matter for a Hearing. On September 29, 2011, the Hearing Officer granted the *Petition to Intervene* and approved the *Joint Procedural Schedule and Protective Order* submitted by Piedmont and the CAD on September 29, 2011. This matter was set for hearing for the week of January 23-27, 2012.

On December 6, 2011, the CAPD filed the Prefiled Testimony of Chris Klein, William H. Novak, and Dave Peters and designated same as confidential. On December 19, 2011, the Consumer Advocate re-filed the same testimony unsealed and undesignated as confidential, with the exception of Footnote 5 of William H. Novak's prefiled testimony.

Stipulation and Settlement Agreement

On December 22, 2011, Piedmont and the Consumer Advocate filed a *Stipulation and Settlement Agreement.* Additionally, Piedmont and the CAPD filed a joint motion seeking modification of rate case evidentiary hearing procedures by requesting the TRA modify its procedures at the January 23, 2012 hearing to facilitate the orderly and reasoned consideration by the TRA of the *Stipulation and Settlement Agreement*. The parties stated the fundamental nature of the hearing to be conducted in this proceeding on January 23, 2012 had changed from a contested evidentiary hearing to a hearing on whether the compromise settlement agreement is just and reasonable and should be approved by the Authority and requested that the TRA redesignate the hearing in this matter for that purpose.

On January 11, 2012, Piedmont filed the *Supplemental Testimony Of David Carpenter On Behalf Of Piedmont Natural Gas Company, Inc.* The Hearing Officer issued an *Order Granting Joint Motion* on January 12, 2012, redesignating the January 23, 2012 contested evidentiary hearing as a hearing to consider the *Stipulation and Settlement Agreement*. The Hearing Officer also granted Piedmont and the CAPD's request that all evidentiary witnesses, with the exception of David Carpenter, be excused from appearing at the hearing and allowed all testimony and exhibits to be entered into the record by stipulation based on the reasonableness of the requests. On January 17, 2012, Piedmont filed its *Affidavits of Publication and Tear Sheets*.

The *Stipulation and Settlement Agreement* filed in this docket was a complete settlement of this matter, and all terms of which are reflected therein. The *Stipulation and Settlement Agreement* includes, among other provisions, the following key provisions:

10. Attrition Period. Piedmont and the Consumer Advocate agree that the appropriate attrition period for use in this proceeding is the 12 months ended February 28, 2013.

11. Revenue Deficiency. The adjustments to Piedmont's filed case described in paragraph 9 above collectively reduce Piedmont's attrition period

revenue deficiency from $16,712,711, an increase of 8.9% to $11,900,000, an increase of 6.3%, and are based upon agreed changes to certain components of Piedmont's working capital, accumulated deferred income taxes, federal and state income tax expense, operating revenues, cost of gas, operations and maintenance expense, operating income, and return on common equity. Subject to Authority approval, Piedmont and the Consumer Advocate agree that this reduction in Piedmont's attrition period revenue deficiency is reasonable and appropriate.

12. Annualized Throughput. Piedmont and the Consumer Advocate agree that the appropriate level of attrition period throughput used herein, and reflected on Attachment B hereto, is 28,816,792 dekatherms, consisting of 18,370,260 dekatherms of tariff sales quantities, 9,901,819 dekatherms of tariff transportation quantities, and 544,713 dekatherms of special contract quantities.

13. Revenue Requirement. Piedmont and the Consumer Advocate agree that Piedmont's attrition period cost of service should include the components set forth on Attachment A hereto, which Piedmont and the Consumer Advocate agree are fair and reasonable to Piedmont and its customers and which include the following:

a. Required Operating Income of $27,824,920;
b. A rate base of $348,872,819;
c. An overall rate of return of 7.98%;
d. A return on common equity of 10.2%;
e. A capital structure consisting of 5.87% short-term debt, 41.42% long-term debt, and 52.71% equity.
f. A cost of short-term debt of 1.59%;
g. A cost of long-term debt of 6.05%;
h. A cost of common equity of 10.2%;

14. Amortization of Deferred Costs. Embedded within the cost of service described above, Piedmont and Consumer Advocate also agree that it is appropriate to provide for the 8-year amortization of certain deferred regulatory assets and rate case expense in the following annual amounts:

a. $2,686,343 in deferred defined benefit pension costs, as authorized by Authority Order dated June 9, 1997 in Docket No. 96-00977;

b. $243,760 in deferred environmental clean-up costs, as authorized by Tennessee Public Service Commission Order dated December 21, 1992 in Docket No. 92-16160;

c. $119,963 in deferred flood response costs as authorized by Authority Order dated November 10, 2010 in Docket No. 10-00185; and

d. $89,983 in rate case expense incurred by Piedmont in conjunction with

this case.

15. Rates. Piedmont and the Consumer Advocate agree that the rates reflected on Attachment B are fair and reasonable and appropriate for use in this proceeding.

16. Piedmont and the Consumer Advocate further stipulate and agree:

a. That the rate design set forth on Attachment B hereto, including the constituent components of rates for each of Piedmont's customer classes, is fair and reasonable and appropriate for use in this proceeding;

b. That the Company shall revert to filing for adjustments to fixed gas cost recovery through the PGA going forward;[1]

c. That the WNA factors and normal heating degree days set forth on Attachments C and D hereto are fair and reasonable and appropriate for use in this proceeding and should be approved by the Authority to be effective March 1, 2012;

d. That the period to which the WNA adjustment should apply going forward consists of the months of October through April of each year;

e. That the depreciation rates set forth in the depreciation study filed by Piedmont witness Rhonda Watts are fair and reasonable and appropriate for use in this proceeding and should be approved by the Authority to be effective March 1, 2012;

f. That for purposes of future defined benefit pension expense and environmental clean-up expense incurred by Piedmont, the deferral mechanisms established pursuant to Authority Order dated June 9, 1997 in Docket No. 96-00977 and Tennessee Public Service Commission Order dated December 21, 1992 in Docket No. 92-16160 should remain in effect;

g. That pursuant to Authority Order dated April 24, 2007 in Docket No. 03-00209, uncollectible gas costs should continue to be addressed through Piedmont's PGA mechanism and that no such costs are included in the revenue requirement or rates stipulated herein;

h. That pending Piedmont's next general rate proceeding, the

[1] The representation of fixed gas costs recovery rates as set forth on Attachment B of the *Stipulation and Settlement Agreement* attached to this Order is reasonable and appropriate in order to align with the elimination of the standard/value customer class distinction and the elimination of step rates in the small and medium general service classifications.

appropriate AFUDC rate applicable to future investment in rate base by Piedmont is the overall rate of return on rate base stipulated herein;

i. That no funding of GTI research or implementation/funding of Piedmont's proposed School Energy Pledge Program will occur or be recovered from Piedmont's customers in conjunction with this case;

j. That the revised rate schedules and service regulations attached hereto as Attachment E are fair and reasonable and should be approved by the Authority to be effective March 1, 2012;

17. Piedmont also agrees to reduce the commodity gas cost component of Piedmont's PGA mechanism in conjunction with the other rate changes agreed to herein and to implement such reduction in rates on February 1, 2012.[2]

18. The Parties hereby agree that the revised rates, tariffs, rate schedules, and service regulations agreed to herein, both individually and in the aggregate, are fair and reasonable to all customer classes and will provide Piedmont with a reasonable opportunity to recover the agreed upon operating revenue requirement and a reasonable rate of return on investment.

THE HEARING

This matter came before the Authority for Hearing on January 23, 2012. Participating in the Hearing were the following parties and their respective attorneys:

Piedmont Natural Gas Company, Inc. – James H. Jeffries IV, Esq., Moore & Van Allen, 100 North Tryon Street, Charlotte, NC 28202 and R. Dale Grimes, Esq., Bass, Berry & Sims, PLC, 150 Third Avenue South, Suite 2800, Nashville, TN 37201; David Carpenter, Vice-President – Planning and Regulatory Affairs, 4720 Piedmont Row Drive, Charlotte, NC 28202.

Consumer Advocate and Protection Division – Ryan McGehee, Esq., Office of the Attorney General, P.O. Box 20207, Nashville, Tennessee 37202.

During the Hearing, counsel for the parties submitted the *Stipulation and Settlement Agreement*, as filed on December 22, 2011, reflecting a complete settlement of the parties, for the consideration by the Authority. Mr. David Carpenter, Vice-President – Planning and Regulatory

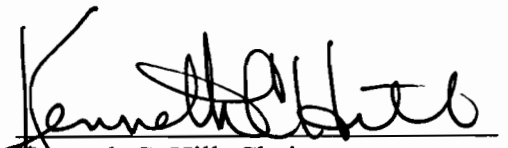
[2] Nothing within this *Stipulation and Settlement Agreement* should be construed as having any impact on the PGA Rule(s) and practice of the Authority.

Affairs, provided testimony to explain and support the *Stipulation and Settlement Agreement* entered into by Piedmont and the Consumer Advocate during the Hearing and also filed prefiled supplemental testimony consisting of eight pages in the docket on January 11, 2012. After hearing from the witness, the parties and providing an opportunity for members of the public to comment, the panel deliberated on the merits of the joint *Stipulation and Settlement Agreement* and voted unanimously to approve and accept the *Stipulation and Settlement Agreement.*

IT IS THEREFORE ORDERED THAT:

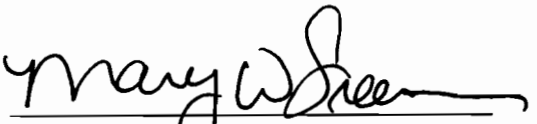
1. The *Stipulation and Settlement Agreement Between Piedmont Natural Gas Company, Inc. and the Consumer Advocate and Protection Division* is approved and accepted and is incorporated into this Order as if fully rewritten herein.[3]

2. The rate design set forth in Attachment A of the *Stipulation and Settlement Agreement* attached to this Order shall be used to allocate the approved $11,900,000 rate increase and the new rates reflected in the *Stipulation and Settlement Agreement* shall take effect for bills rendered on or after March 1, 2012.



Kenneth C. Hill, Chairman

Sara Kyle, Director



Mary Freeman, Director

[3] A typographical error in Attachment C to the *Stipulation and Settlement Agreement* was corrected by Piedmont on March 13, 2012, without objection by the CAPD. The correction did not change the settlement terms.

EXHIBIT 1

BEFORE THE TENNESSEE REGULATORY AUTHORITY
NASHVILLE, TENNESSEE

IN RE:	)	
	)	
PETITION OF PIEDMONT NATURAL GAS COMPANY, INC. FOR AN ADJUSTMENT TO ITS RATES, APPROVAL OF CHANGES TO ITS RATE DESIGN, AMORTIZATION OF CERTAIN DEFERRED ASSETS, APPROVAL OF NEW DEPRECIATION RATES, APPROVAL OF REVISED TARIFFS AND SERVICE REGULATIONS, AND APPROVAL OF A NEW ENERGY EFFICIENCY PROGRAM AND GTI FUNDING	)	**DOCKET NO. 11-00144**

STIPULATION AND SETTLEMENT AGREEMENT BETWEEN PIEDMONT NATURAL GAS COMPANY, INC. AND THE CONSUMER ADVOCATE AND PROTECTION DIVISION

Piedmont Natural Gas Company, Inc. ("Piedmont" or "Company") and Robert E. Cooper, Jr., the Tennessee Attorney General and Reporter, through the Consumer Advocate and Protection Division ("Consumer Advocate") (collectively the "Parties"), constituting all of the parties to the above-captioned general rate proceeding and in comprehensive settlement of the matters at issue therein, do hereby stipulate and agree as follows:

BACKGROUND

1. Piedmont is incorporated under the laws of the State of North Carolina and is duly domesticated and engaged in the business of transporting, distributing and selling natural gas in the States of Tennessee, North Carolina and South Carolina. Piedmont's principal office and place of business is located at 4720 Piedmont Row Drive, Charlotte, North Carolina.

2. Piedmont is a public utility in Tennessee and its natural gas distribution business is subject to regulation and supervision by the Tennessee Regulatory Authority ("TRA" or the "Authority") pursuant to Chapter 4 of Title 65 of the Tennessee Code Annotated.

3. Piedmont is engaged in the business of distributing natural gas to customers located in Nashville and the remainder of Davidson County as well as portions of the adjoining counties of Cheatham, Dickson, Robertson, Rutherford, Sumner, Trousdale, Williamson, and Wilson and in certain incorporated towns and cities located therein. Piedmont has not filed for a rate increase with the Authority since 2003.

4. On September 2, 2011, Piedmont filed a petition for adjustment of its rates and charges, approval of changes to its rate design, amortization of certain deferred assets, approval of new depreciation rates, approval of revised tariffs and service regulations, and approval of a new energy efficiency program and Gas Technology Institute ("GTI") funding. In its petition, Piedmont sought an increase in its annual revenues of $16,712,711, an increase of 8.9%.

5. On September 21, 2011, the Consumer Advocate filed a Petition to Intervene in this proceeding which was allowed by Authority order dated September 29, 2011 without an objection. No other entity has sought or been granted party status in this proceeding.

6. Since the filing of Piedmont's petition, the parties to this proceeding have engaged in substantial discovery, informal information exchanges and extensive communication. In addition to the information provided pursuant to the Authority's Minimum Filing Requirements, Piedmont has responded to 85 data requests from the Authority's Staff and 55 data requests from the Consumer Advocate. Piedmont representatives and representatives from the Consumer Advocate have also spent a significant amount of time discussing the various aspects of Piedmont's rate case.

7. On December 6, 2011, the Consumer Advocate filed testimony in this proceeding challenging several aspects of Piedmont's petition, including the requested revenue increase. In this testimony, witnesses for the Consumer Advocate recommended a number of changes to the relief sought by Piedmont, including a proposed reduction in Piedmont's attrition period revenue requirement. The Consumer Advocate proposed a revenue increase of $9.863 million, an amount $6.849 million less than that proposed by Piedmont.

SETTLEMENT

8. Following Piedmont's review of the Consumer Advocate's testimony, representatives of Piedmont and the Consumer Advocate met by phone and in-person to discuss the possibility of a settlement in this proceeding.

9. Based on the exchange of information and discussions described above, and in order to resolve all disputed issues in this case through settlement and avoid the need for further litigation, Piedmont and the Consumer Advocate have agreed to certain adjustments to Piedmont's filing, including adjustments to its proposed revenues, expenses, net operating income, net operating income for return, rate base, and return on rate base, among others. Piedmont and the Consumer Advocate have also agreed to the disposition of a variety of non-rate matters at issue in this proceeding. Piedmont's and the Consumer Advocate's agreements encompass the matters discussed below.

10. Attrition Period. Piedmont and the Consumer Advocate agree that the appropriate attrition period for use in this proceeding is the 12 months ended February 28, 2013.

11. Revenue Deficiency. The adjustments to Piedmont's filed case described in paragraph 9 above collectively reduce Piedmont's attrition period revenue deficiency from

$16,712,711, an increase of 8.9%, to $11,900,000, an increase of 6.3%, and are based upon agreed changes to certain components of Piedmont's working capital, accumulated deferred income taxes, federal and state income tax expense, operating revenues, cost of gas, operations and maintenance expense, operating income, and return on common equity. Subject to Authority approval, Piedmont and the Consumer Advocate agree that this reduction in Piedmont's attrition period revenue deficiency is reasonable and appropriate.

12. Annualized Throughput. Piedmont and the Consumer Advocate agree that the appropriate level of attrition period throughput used herein, and reflected on Attachment B hereto, is 28,816,792 dekatherms, consisting of 18,370,260 dekatherms of tariff sales quantities, 9,901,819 dekatherms of tariff transportation quantities, and 544,713 dekatherms of special contract quantities.

13. Revenue Requirement. Piedmont and the Consumer Advocate agree that Piedmont's attrition period cost of service should include the components set forth on Attachment A hereto, which Piedmont and the Consumer Advocate agree are fair and reasonable to Piedmont and its customers and which include the following:

a. Required Operating Income of $27,824,920;

b. A rate base of $ 348,872,819;

c. An overall rate of return of 7.98%;

d. A return on common equity of 10.2%;

e. A capital structure consisting of 5.87% short-term debt, 41.42% long-term debt, and 52.71% equity.

f. A cost of short-term debt of 1.59%;

g. A cost of long-term debt of 6.05%;

h. A cost of common equity of 10.2%;

14. Amortization of Deferred Costs. Embedded within the cost of service described above, Piedmont and the Consumer Advocate also agree that it is appropriate to provide for the 8-year amortization of certain deferred regulatory assets and rate case expense in the following annual amounts:

a. $2,686,343 in deferred defined benefit pension costs as authorized by Authority Order dated June 9, 1997 in Docket No. 96-00977;

b. $243,760 in deferred environmental clean-up costs as authorized by Tennessee Public Service Commission Order dated December 21, 1992 in Docket No. 92-16160;

c. $119,963 in deferred flood response costs as authorized by Authority Order dated November 10, 2010 in Docket No. 10-00185; and

d. $89,983 in rate case expense incurred by Piedmont in conjunction with this case.

15. Rates. Piedmont and the Consumer Advocate agree that the rates reflected on Attachment B are fair and reasonable and appropriate for use in this proceeding.

16. Piedmont and the Consumer Advocate further stipulate and agree:

a. That the rate design set forth on Attachment B hereto, including the constituent components of rates for each of Piedmont's customer classes, is fair and reasonable and appropriate for use in this proceeding;

b. That the Company shall revert to filing for adjustments to fixed gas cost recovery through the PGA going forward;[1]

[1] The representation of fixed gas cost recovery rates as set forth on Attachment B is reasonable and appropriate in order to align with the elimination of the standard/value customer class distinction and the elimination of step rates in the small and medium general service classifications.

c. That the WNA factors and normal heating degree days set forth on Attachments C and D hereto are fair and reasonable and appropriate for use in this proceeding and should be approved by the Authority to be effective March 1, 2012;

d. That the period to which the WNA adjustment should apply going forward consists of the months of October through April of each year;

e. That the depreciation rates set forth in the depreciation study filed by Piedmont witness Rhonda Watts are fair and reasonable and appropriate for use in this proceeding and should be approved by the Authority to be effective March 1, 2012;

f. That for purposes of future defined benefit pension expense and environmental clean-up expense incurred by Piedmont, the deferral mechanisms established pursuant to Authority Order dated June 9, 1997 in Docket No. 96-00977 and Tennessee Public Service Commission Order dated December 21, 1992 in Docket No. 92-16160 should remain in effect;

g. That pursuant to Authority Order dated April 24, 2007 in Docket No. 03-00209, uncollectible gas costs should continue to be addressed through Piedmont's PGA mechanism and that no such costs are included in the revenue requirement or rates stipulated herein;

h. That pending Piedmont's next general rate proceeding, the appropriate AFUDC rate applicable to future investment in rate base by Piedmont is the overall rate of return on rate base stipulated herein;

i. That no funding of GTI research or implementation/funding of Piedmont's proposed School Energy Pledge Program will occur or be recovered from Piedmont's customers in conjunction with this case;

j. That the revised rate schedules and service regulations attached hereto as Attachment E are fair and reasonable and should be approved by the Authority to be effective March 1, 2012;

17. Piedmont also agrees to reduce the commodity gas cost component of Piedmont's PGA mechanism in conjunction with the other rate changes agreed to herein and to implement such reduction in rates on February 1, 2012.[2]

18. The Parties hereby agree that the revised rates, tariffs, rate schedules, and service regulations agreed to herein, both individually and in the aggregate, are fair and reasonable to all customer classes and will provide Piedmont with a reasonable opportunity to recover the agreed upon operating revenue requirement and a reasonable rate of return on investment.

19. The Parties agree to support this Stipulation and Settlement Agreement before the Authority and in any hearing, proposed order, or brief conducted or filed in this proceeding; provided, however, that the settlement of any issue provided for herein shall not be cited as precedent by any of the stipulating Parties hereto in any unrelated or separate proceeding or docket before the Authority. The resolution of issues reflected herein is the result of give and take negotiations between the Parties and does not necessarily reflect the position of any single Party on any discrete issue. None of the signatories hereto shall be deemed to have acquiesced in any ratemaking or procedural principle, including without limitation, any cost of service determination or cost allocation or revenue related methodology and neither Party waives its right to take positions with respect to the matters settled herein in future proceedings before the Authority. This Stipulation and Agreement shall not have any precedential effect in any future

[2] Nothing within this Stipulation and Settlement Agreement should be construed as having any impact on the PGA Rule and practice of the Authority.

proceeding or be binding upon any of the settling Parties in this or any other jurisdiction except to the extent necessary to implement the provisions hereof.

20. The Parties agree that all pre-filed testimony and exhibits of the Parties (including pre-filed supplemental testimony and exhibits supporting this Stipulation and Settlement Agreement) may be admitted into evidence without objection and the Parties hereby waive their right to cross-examine all witnesses with respect to such pre-filed testimony and exhibits; provided, however, that should questions be asked of such witnesses by any person at the hearing of this matter (including any questions by Directors or Authority staff), the Parties may cross-examine any witness with respect to such questions consistent with the agreements set forth in this Stipulation and Agreement.

21. The provisions of this Stipulation and Settlement Agreement are agreements reached in compromise and settlement and solely for the purpose of resolving this docket without the need for further litigation.

22. The stipulations agreed to in this Stipulation and Settlement Agreement, which are the product of negotiations and substantial communication and compromise between the Parties, are just and reasonable and in the public interest. The Parties jointly recommend that the Authority issue an order adopting this Stipulation and Settlement Agreement in its entirety without modification.

23. If the TRA does not accept the Stipulation and Settlement Agreement in whole and as full and final settlement of the issues in this Docket, this Stipulation and Settlement Agreement shall terminate and the Parties shall not be bound by any position set forth in this Stipulation and Settlement Agreement. Should this Stipulation and Settlement Agreement terminate, it will be considered void and have no binding effect, and the signatories to this

Stipulation and Settlement Agreement reserve their rights to fully participate in all relevant proceedings notwithstanding their agreement to the terms of this Stipulation and Settlement Agreement. The provisions of this Stipulation and Settlement Agreement are not severable.

24. By agreeing to this Stipulation and Settlement Agreement, no Party waives any right to continue litigating this matter should the Stipulation and Settlement Agreement be rejected by the TRA in whole or in part.

25. No provision of this Stipulation and Settlement Agreement shall be deemed an admission of any Party.

26. The Parties agree to support this Stipulation and Settlement Agreement in any proceeding before the Authority in this Docket; however, the Parties further agree and request the Authority to order that the settlement of any issue pursuant to this Stipulation and Settlement Agreement shall not be cited by the Parties or any other entity as binding precedent in any other proceeding before the Authority or any court, state or federal.

27. The provisions of this Stipulation and Settlement Agreement do not necessarily reflect the positions asserted by any Party, and no Party to this Stipulation and Settlement Agreement waives the right to assert any position in any future proceeding except as expressly stipulated herein. This Stipulation and Settlement Agreement shall not have precedential effect in any future proceeding or be binding on any Party except to the limited extent necessary to implement the provisions hereof.

28. This Stipulation and Settlement Agreement shall be governed by and construed under the laws of the State of Tennessee, notwithstanding conflict of law provisions.

The foregoing is agreed and stipulated to this 21 st day of December, 2011.

PIEDMONT NATURAL GAS COMPANY, INC.

R. Dale Grimes
Bass, Berry & Sims PLC
150 Third Avenue South
Nashville, Tennessee 37201
Telephone: 615-742-6244

James H. Jeffries IV
Moore & Van Allen PLLC
Suite 4700
100 North Tryon Street
Charlotte, North Carolina 28202-4003

CONSUMER ADVOCATE AND PROTECTION DIVISION

Robert E. Cooper, Jr. (BPR No. 10934)
Attorney General and Reporter

Ryan L. McGehee (BPR No. 025559)
Assistant Attorney General
Office of the Attorney General
Consumer Advocate and Protection Division
P.O. Box 20207
Nashville, Tennessee 37202-0207
Telephone: 615-532-5512

ATTACHMENT A

Settlement Attachment A
Schedule 2

Piedmont Natural Gas Company, Inc.
TRA Docket #11-00144
Rate Base
For the 12 Months Ending February 28, 2013

Line No.	Category	Settlement
1	Utility Plant in Service	$713,852,981
2	Construction Work in Progress	$33,025,962
3	Utility Plant Capital Lease	$0
4	Limited-Term Utility Plant - Net	$0
5	Working Capital	$30,718,420
6	Deferred Maintenance	$0
7	Total Additions	$777,597,364
8	Accumulated Depreciation	$ 336,408,892
9		
10	Accumulated Deferred Income Taxes	$87,138,706
11	Customer Advances for Construction	$0
12	Contributions In Aid of Construction	$5,176,946
13	Unamortized Investment Tax Credit	$0
14	Utility Plant Acquisition Adj.	$0
15	Total Deductions	$428,724,544
16	Rate Base (Line 7 - Line 15)	$348,872,819

Settlement Attachment A
Schedule 3

Piedmont Natural Gas Company, Inc.
TRA Docket #11-00144
Income Statement at Current Rates
For the 12 Months Ending February 28, 2013

Line No.	Category	Settlement
1	Operating Revenues	$189,205,584
2	Cost of Gas	$94,601,622
3	Gross Margin	$94,603,962
4	Operations and Maintenance Expense	$40,114,764
5	Depreciation and Amortization Expense	$19,600,350
6	Taxes Other Than Income	$9,048,687
7	State Excise Tax	$1,273,299
8	Federal Income Tax	$6,376,169
9		$76,413,270
10	Interest On Customer Deposits	$412,591
11	AFUDC	$2,817,115
12	Net Operating Income for Return	$20,595,215

Settlement Attachment A
Schedule 4

Piedmont Natural Gas Company, Inc.
TRA Docket #11-00144
Operation & Maintenance Expenses
For the 12 Months Ending February 28, 2013

Line No.	Category	Settlement
1	Salaries and Wages	$18,068,459
2	Transmission & Distribution Expense	$5,631,656
3	Uncollectible Accounts Expense	$57,564
4	Other Customer Accounts Expense	$880,193
5	Administrative and General	$15,358,729
6	Sales Expense	$118,163
7	Total O&M Expense	$40,114,764

Settlement Attachment A
Schedule 5

Piedmont Natural Gas Company, Inc.
TRA Docket #11-00144
Taxes Other Than Income Taxes
For the 12 Months Ending February 28, 2013

Line No.	Category	Settlement
1	Other General Taxes	$5,243
2	Gross Receipts Tax	$1,485,070
3	Property Taxes	$5,218,572
4	Franchise Tax	$930,057
5	Payroll Taxes	$1,409,745
6	Total Taxes Other Than Income Taxes	$9,048,687

Settlement Attachment A
Schedule 6

Piedmont Natural Gas Company, Inc.
TRA Docket #11-00144
Excise and Income Taxes
For the 12 Months Ending February 28, 2013

Line No.		Category		Settlement
1		Operating Revenues		$94,603,962
2		Salaries and Wages		$18,068,459
4		Transmission & Distribution Expense		$5,631,656
5		Uncollectible Accounts Expense		$57,564
6		Other Customer Accounts Expense		$880,193
7		Administrative and General		$15,358,729
8		Sales Expense		$118,163
9		Depreciation and Amortization Expense		$19,600,350
10		Taxes Other Than Income		$9,048,687
11		NOI Before Excise and Income Taxes		$25,840,160
12		AFUDC		$2,817,115
13		Interest Expense		($9,068,052)
14		Pre-tax Book Income		$19,589,223
15		Schedule M Adjustments		$0
16		Excise Taxable Income		$19,589,223
17		Excise Tax Rate		6.50%
18		Excise Tax Expense		1,273,299
19		Excise Tax NOL		-
20				1,273,299
21				19,589,223
22				-
23		Excise Tax		(1,273,299)
24		Schedule M Adjustments		-
25		FIT Taxable Income		18,315,923
26		FIT Rate		35.00%
27		Federal Income Tax Expense		6,410,573
28		ITC Amortization		($34,404)
29		Federal Income Tax Expense		6,376,169

Settlement Attachment A
Schedule 7

Piedmont Natural Gas Company, Inc.
TRA Docket #11-00144
Revenue Conversion Factor
For the 12 Months Ending February 28, 2013

Line No.	Category		Settlement
1	Operating Revenues		1.000000
2	Add: Forfeited Discounts	-	-
3	Balance		1.000000
4	Uncollectible Ratio	0.0003	0.000308
5	Balance		0.999692
6	State Excise Tax	0.0650	0.064980
7	Balance		0.934712
8	Federal Income Tax	0.3500	0.327149
9	Balance		0.607563
10	Revenue Conversion Factor (Line 1 / Line 11)		1.645921

Settlement Attachment A
Schedule 8

Piedmont Natural Gas Company, Inc.
TRA Docket #11-00144
Cost of Capital
For the 12 Months Ending February 28, 2013

Line No.	Final Capital Structure	Ratio	Cost	Weighted Cost	Tax Deductible
1	Short Term Debt	5.87%	1.59%	0.093%	0.093%
2	Long Term Debt	41.42%	6.05%	2.506%	2.506%
3	Common Equity	52.71%	10.20%	5.376%	
4	Total	100.00%		7.98%	2.599%

ATTACHMENT B

Piedmont Natural Gas Company, Inc.
TRA Docket #11-00144
Proposed Rates and Revenues by Rate Schedule

Settlement Attachment B
Schedule 1

(dekatherms) Rate Schedule	Attrition Period Billing Determinants (1)	"Clean" Billing Rates (2)	Proposed Revenues (3)	Proposed Margin Rates (4)	Proposed Margin (5)	Proposed PGA Demand Rates (6)	Proposed PGA Demand (7)	Current PGA Commodity Rates (8)	Current PGA Commodity (9)
Residential - 301									
Bills - winter (Nov - Mar)	760,041	17.45	$13,262,715	17.45	$13,262,715				
Bills - summer (Apr - Oct)	1,055,850	13.45	$14,201,183	13.45	$14,201,183				
Winter (Nov - Mar)	9,068,898	8.29400	$75,217,440	3.20000	$29,020,474	0.32800	$2,974,599	4.76600	$43,222,368
Summer (Apr - Oct)	2,061,316	7.78400	$16,065,897	2.70000	$5,565,553	0.32800	$676,112	4.76600	$9,824,232
Total	11,130,214		$118,747,235		$62,049,925		$3,650,711		$53,046,600
Total Residential									
Bills	1,815,891		$27,463,898		$27,463,898		$0		$0
DTs	11,130,214		$91,283,337		$34,586,027		$3,650,711		$53,046,600
Small General - 302									
Bills	198,023	44.00	$8,713,012	44.00	$8,713,012				
Winter (Nov - Mar)	3,744,501	6.63400	$32,330,022	3.54000	$13,255,534	0.32800	$1,228,198	4.76600	$17,846,292
Summer (Apr - Oct)	1,353,699	6.09400	$10,956,840	3.00000	$4,061,097	0.32800	$444,013	4.76600	$6,451,729
Total	5,098,200		$51,999,874		$26,029,643		$1,672,209		$24,298,021
Medium General - 352									
Bills	4,924	225.00	$1,107,900	225.00	$1,107,900				
Winter (Nov - Mar)	1,150,745	6.63400	$9,935,532	3.54000	$4,073,637	0.32800	$377,444	4.76600	$5,484,451
Summer (Apr - Oct)	416,013	6.09400	$3,367,209	3.00000	$1,248,039	0.32800	$136,452	4.76600	$1,982,718
Total	1,566,758		$14,410,641		$6,429,576		$513,896		$7,467,169
Total Commercial									
Bills	202,947		$9,820,912		$9,820,912		$0		$0
DTs	6,664,958		$66,410,615		$32,459,219		$2,186,105		$31,765,190
Large General Sales Service - 303									
Bills	475	800.00	$380,000	800.00	$380,000				
Demand dt	61,947	12.92520	$800,679	8.0000	$495,577	4.92520	$305,102	0.00000	$0
First 1,500 dt	373,565	5.73420	$2,142,268	0.9682	$361,715		$0	4.76600	$1,780,554
Next 2,500 dt	136,761	5.66130	$774,245	0.8953	$122,442		$0	4.76600	$651,803
Next 5,000 dt	43,004	5.41100	$232,695	0.6450	$27,738		$0	4.76600	$204,957
Over 9,000 dt	9,488	5.04240	$47,842	0.2764	$2,622		$0	4.76600	$45,220
Total	562,848		$4,377,729		$1,390,094		$305,102		$2,982,534
Interruptible Sales Service - 304									
Bills	15	800.00	$12,000	800.00	$12,000				
First 1,500 dt	1,928	5.73420	$11,056	0.9682	$1,867		$0	4.76600	$9,189
Next 2,500 dt	0	5.66130	$0	0.8953	$0		$0	4.76600	$0
Next 5,000 dt	0	5.41100	$0	0.6450	$0		$0	4.76600	$0
Over 9,000 dt	0	5.04240	$0	0.2764	$0		$0	4.76600	$0
Total	1,928		$23,056		$13,867		$0		$9,189
Firm Transportation Service - 313									
Bills	1,021	800.00	$816,800	800.00	$816,800				
Demand dt	157,726	12.92520	$2,038,823	8.0000	$1,261,798	4.92520	$776,826	0.00000	$0
First 1,500 dt	1,060,164	0.96820	$1,045,815	0.9682	$1,045,815		$0	0.00000	$0
Next 2,500 dt	548,397	0.89530	$490,980	0.8953	$490,980		$0	0.00000	$0
Next 5,000 dt	170,738	0.64500	$110,126	0.6450	$110,126		$0	0.00000	$0
Over 9,000 dt	6,421	0.27640	$1,775	0.2764	$1,775		$0	0.00000	$0
Total	1,805,720		$4,504,119		$3,727,294		$776,826		$0
Interruptible Transportation Service - 314									
Bills	653	800.00	$522,400	800.00	$522,400				
First 1,500 dt	863,471	0.96820	$836,013	0.9682	$836,013		$0	0.00000	$0
Next 2,500 dt	973,339	0.89530	$871,430	0.8953	$871,430		$0	0.00000	$0
Next 5,000 dt	1,099,176	0.64500	$708,969	0.6450	$708,969		$0	0.00000	$0
Over 9,000 dt	5,160,113	0.27640	$1,426,255	0.2764	$1,426,255		$0	0.00000	$0
Total	8,096,099		$4,365,067		$4,365,067		$0		$0
Total Large Volume									
Bills	2,164		$1,731,200		$1,731,200		$0		$0
Demand	219,672		$2,839,302		$1,757,378		$1,081,928		$0
DTs	19,466,598		$13,269,971		$9,496,322		$1,081,928		$2,691,723
Resale Service - 310									
Bills	31								
Demand	2,400	12.92520	$31,020	8.00000	$19,200	4.92520	$11,820	0.00000	$0
Commodity	10,312	5.66600	$58,428	0.9000	$9,281		$0	4.76600	$49,147
Special Contracts (1)	544,713		$607,737		$489,532		$118,205		
Bills									
TOTAL THROUGHPUT - SALES CUSTOMERS	18,370,260		$189,647,983		$95,941,586		$8,153,738		$87,552,660
TOTAL THROUGHPUT - TRANSPORTATION CUSTOMERS	9,901,819		$8,869,186		$8,092,361		$776,826		$0
TOTAL THROUGHPUT - SPECIAL CONTRACTS	544,713		$607,737		$489,532		$118,205		$0
TOTAL	28,816,792		$199,124,906		$104,523,479		$7,046,769		$87,552,660
OTHER REVENUES			$1,980,666		$1,980,666				
GRAND TOTAL OPERATING REVENUES			$201,105,572		$106,504,145				
PROFORMA OPERATING REVENUES PER WILLIAM H. NOVAK (2)			$189,205,584		$94,893,982				
REVENUE ADJUSTMENT			$11,899,988		$11,906,163				

(1) Includes only the two Tennessee Regulatory Authority ("Authority") approved special contracts currently in place, which are Bridgestone and DuPont. These special contracts were approved by the Authority, respectively, in Docket Nos. 10-00015 and 10-00142.
(2) Attrition Period Revenue per William H. Novak Direct Testimony, Attachment WHN-4, Schedule 1, Line 14.

Settlement Attachment B
Schedule 2

PIEDMONT NATURAL GAS COMPANY, INC.
Tennessee Service Territory
Billing Rates Effective: March 1, 2012

Rate Schedule	Description	Tariff Rate Approved in Docket No. 11-00144	Cumulative PGA Demand	Cumulative PGA Commodity	Current Refund	Current ACA Demand	Current ACA Commodity	Current IPA	Total Adj. Factor (Sum Col.2 thru Col.6)	Proposed Billing Rate (Col.1+Col.7)
		<1>	<2>	<3>	<4>	<5a>	<5b>	<6>	<7>	<8>
	Monthly Charge-Nov.-Mar.	$17.45								$17.45
Residential	Monthly Charge-Apr.-Oct.	$13.45								$13.45
301	Nov.- Mar. per TH	0.32000	0.03280	0.47660	0.00000	0.03450	-0.02597	0.00673	0.52466	0.84466
301	Apr.- Oct. per TH	0.27000	0.03280	0.47660	0.00000	0.03450	-0.02597	0.00673	0.52466	0.79466
Small General	Monthly Charge	$44.00								$44.00
302	Nov.- Mar. per TH	0.35400	0.03280	0.47660	0.00000	0.03450	-0.02597	0.00673	0.52466	0.87866
302	Apr.- Oct. per TH	0.30000	0.03280	0.47660	0.00000	0.03450	-0.02597	0.00673	0.52466	0.82466
Medium General	Monthly Charge	$225.00								$225.00
352	Nov.- Mar. per TH	0.35400	0.03280	0.47660	0.00000	0.03450	-0.02597	0.00673	0.52466	0.87866
352	Apr.- Oct. per TH	0.30000	0.03280	0.47660	0.00000	0.03450	-0.02597	0.00673	0.52466	0.82466
Natural Gas Vehicle Fuel	Monthly Charge	$40.00								$40.00
342	Rate per TH	0.23109	0.03280	0.47660	0.00000	0.03450	-0.02597	0.00673	0.52466	0.75575
342	Rate per GGE	0.29117	0.04133	0.60052	0.00000	0.04347	-0.03272	0.00848	0.66108	0.95225
303	Monthly Charge	$800.00								$800.00
Firm	Demand Charge per TH	0.80000	0.49252		0.00000	0.52652			1.01904	1.81904
General Sales	First 15,000 TH/TH	0.09682		0.47660	0.00000		-0.02597	0.00673	0.45736	0.55418
	Next 25,000 TH/TH	0.08953		0.47660	0.00000		-0.02597	0.00673	0.45736	0.54689
	Next 50,000 TH/TH	0.06450		0.47660	0.00000		-0.02597	0.00673	0.45736	0.52186
	Over 90,000 TH/TH	0.02764		0.47660	0.00000		0.00000	0.00673	0.48333	0.51097
304	Monthly Charge	$800.00								$800.00
Interruptible	First 15,000 TH/TH	0.09682		0.47660	0.00000		-0.02597	0.00673	0.45736	0.55418
General Sales	Next 25,000 TH/TH	0.08953		0.47660	0.00000		-0.02597	0.00673	0.45736	0.54689
	Next 50,000 TH/TH	0.06450		0.47660	0.00000		-0.02597	0.00673	0.45736	0.52186
	Over 90,000 TH/TH	0.02764		0.47660	0.00000		0.00000	0.00673	0.48333	0.51097
313	Monthly Charge	$800.00								$800.00
Firm	Demand Charge per TH	0.80000	0.49252		0.00000	0.52652			1.01904	1.81904
Transportation	First 15,000 TH/TH	0.09682			0.00000				0.00000	0.09682
	Next 25,000 TH/TH	0.08953			0.00000				0.00000	0.08953
	Next 50,000 TH/TH	0.06450			0.00000				0.00000	0.06450
	Over 90,000 TH/TH	0.02764			0.00000				0.00000	0.02764
314	Monthly Charge	$800.00								$800.00
Interruptible	First 15,000 TH/TH	0.09682			0.00000				0.00000	0.09682
Transportation	Next 25,000 TH/TH	0.08953			0.00000				0.00000	0.08953
	Next 50,000 TH/TH	0.06450			0.00000				0.00000	0.06450
	Over 90,000 TH/TH	0.02764			0.00000				0.00000	0.02764
310	Demand Charge per TH	0.80000	0.49252		0.00000	0.52770			1.02022	1.82022
Resale Service	Commodity Charge	0.09000		0.47660	0.00000		-0.02597	0.00673	0.45736	0.54736

NOTES:

1) In accordance with the Tennessee Public Service Commission order in Docket U-7074 customers metered inside Davidson County are required to pay an additional 6.93% for collection of the Metro Franchise Fee. Customers served by the Fairview, Greenbrier, Hartsville, Mt. Juliet and White House systems are required to pay 5.0%. Customers served by the Franklin and Nolensville systems are required to pay 3%. Commercial customers on the Ashland City system are required to pay 5%.

2) The Monthly Charge for Rate Schedule 342 is not applicable to gas service provided at the Company's Premises. The Company may bill in units of Gas Gallon Equivalent ("GGE") for gas service provided at the Company's Premises under Rate Schedule 342. The rates convert 1.26 Therms to 1 GGE.

ATTACHMENT C

REVISED
SETTLEMENT EXHIBIT C

Piedmont Natural Gas Company, Inc.
TRA Docket #11-00144
WNA Factors effective March 1, 2012

Revised
Settlement Attachment C

Rate Schedule	November - March "R" Factor ($/Therm)	October & April "R" Factor ($/Therm)	Heat Sensitivity Factor (HSF) (Therms/DDD)	Base Factor (BL) (Therms/Month)
Residential - 301	0.32000	0.27000	0.17945	7.91318
Small & Medium General - 302 & 352	0.35400	0.30000	0.74873	104.85079

ATTACHMENT D

Piedmont Natural Gas Company, Inc.
TRA Docket # 11-00144
Nashville Heating Degree Days

Settlement Attachment D

NORMAL DAILY WEATHER FOR THE 30 YEAR PERIOD ENDING MAY 2011

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	25.57	22.67	19.40	11.23	2.77	0.30	0.00	0.00	0.00	2.33	7.67	20.77
2	24.30	22.67	17.57	8.73	2.63	0.13	0.00	0.00	0.00	2.77	9.80	21.10
3	24.20	24.20	19.03	8.47	4.27	0.13	0.00	0.00	0.00	3.20	11.60	20.00
4	24.43	26.30	16.40	10.00	4.47	0.13	0.00	0.00	0.00	2.73	12.10	21.37
5	25.93	27.10	16.70	11.03	2.97	0.07	0.00	0.00	0.03	3.07	12.70	23.37
6	24.60	26.67	16.77	10.70	2.27	0.10	0.00	0.00	0.13	3.50	14.80	24.47
7	25.73	26.47	17.13	9.33	1.73	0.10	0.00	0.00	0.03	4.77	13.43	23.63
8	27.50	25.47	16.33	8.37	1.87	0.00	0.00	0.00	0.00	4.33	12.70	21.77
9	26.37	25.30	17.53	10.13	1.63	0.00	0.00	0.00	0.00	3.67	11.50	21.50
10	26.77	25.30	18.87	9.03	1.73	0.07	0.00	0.00	0.00	3.73	13.27	22.53
11	28.20	24.33	17.17	6.40	1.47	0.00	0.00	0.00	0.00	4.33	13.80	22.60
12	25.37	25.50	15.63	6.47	1.20	0.03	0.00	0.00	0.00	4.27	15.60	23.63
13	25.73	24.70	14.67	6.63	1.70	0.17	0.00	0.10	0.10	4.43	15.40	23.17
14	27.57	21.77	15.03	5.50	1.63	0.00	0.00	0.00	0.23	5.33	14.50	22.40
15	28.57	21.57	13.63	7.10	1.70	0.00	0.00	0.00	0.10	4.93	14.67	22.30
16	28.30	21.63	13.93	7.47	2.20	0.00	0.00	0.00	0.33	5.87	15.97	23.80
17	27.90	22.50	12.77	7.50	1.77	0.00	0.00	0.00	0.47	5.77	16.83	23.30
18	28.43	21.13	11.53	6.03	1.57	0.00	0.00	0.00	0.33	5.80	15.37	25.20
19	29.43	20.53	12.63	4.93	1.33	0.00	0.00	0.00	0.60	7.50	12.83	26.23
20	29.30	17.83	12.57	4.60	1.17	0.00	0.00	0.00	0.53	7.73	14.47	26.80
21	29.07	16.47	14.97	5.13	1.30	0.03	0.00	0.00	1.27	6.17	16.77	25.30
22	26.70	19.50	14.70	4.53	1.20	0.03	0.00	0.00	1.53	6.70	17.57	24.70
23	26.30	19.37	12.80	5.20	0.43	0.00	0.00	0.00	1.80	7.47	16.67	26.00
24	26.00	20.33	12.00	4.93	0.27	0.00	0.00	0.00	1.80	8.53	17.57	28.43
25	27.93	21.10	11.27	3.97	0.63	0.00	0.00	0.00	1.27	8.10	15.93	31.37
26	29.00	20.57	11.37	4.07	0.27	0.00	0.00	0.00	1.60	7.70	15.03	28.70
27	27.97	19.70	11.03	4.70	0.47	0.00	0.00	0.00	2.07	9.03	14.60	23.33
28	25.70	20.80	10.33	4.63	0.47	0.00	0.00	0.03	1.83	9.50	17.30	22.77
29	23.83	*4.93*	10.90	3.80	0.67	0.00	0.00	0.07	2.10	8.53	18.30	24.47
30	24.33		11.33	2.70	0.53	0.00	0.00	0.00	2.20	7.10	18.90	24.17
31	25.40		10.90		0.43		0.00	0.00		6.03		22.50
Calendar Total	826	636	447	203	49	1	0	0	20	175	438	742
Cycle Total	798	806	518	324	108	16	0	0	1	77	311	579

NON-LEAP YEAR TOTAL	3,538
LEAP YEAR TOTAL	3,553

Note: Degree Days for February 29 must be multiplied by 4 to arrive at the true DDD for this day, for purposes of applying the WNA adjustment.

ATTACHMENT E

Piedmont Natural Gas Company, Inc.
Tennessee
Index of Tariff & Service Regulations

RATE SCHEDULE NO. 301
Residential Service

AVAILABILITY
Gas Service under this Rate Schedule is available in the area served by the Company in the State of Tennessee, upon application to and consent by the Company to such Service, as provided in the Company's Service Regulations, to any full requirements single private residences, including the separate private units of apartment houses and other multiple dwellings, actually used for residential purposes, which are separately metered where the Company's distribution mains are suitable for supplying the desired service. N

CHARACTER OF SERVICE
The nature of Service provided by Company to Customer under this Rate Schedule is firm sales Service. Rate Schedule 301 applies to all residential customers. N

MARGIN RATE	Winter (November-March)	Summer (April-October)	
Monthly Charge	$17.45	$13.45	I
Commodity Charge (per therm)	$.32000	$.27000	

MONTHLY CHARGE
A charge will be billed monthly to all Customers for the availability of gas service. This charge will be in addition to the Commodity Charge for gas delivered. The Monthly Charge will be billed from the date of initial service until service is terminated at the Customer's request. T

COMMODITY CHARGE
The rate per therm shall be billed on the quantity of gas delivered by Company to Customer's premises. N

BACKUP SERVICE
When gas service is being supplied for use as a Backup Service for the dual-fuel heat pump or for similar use where the Customer's equipment is specifically designed by the manufacturer or is modified by the Customer or others for the purpose of using natural gas as the equipment's backup energy source, there shall be payable monthly in addition to all and other charges under this Rate Schedule a Backup Service Demand Charge individually determined for each Customer based upon the Customer's applicable gas equipment input rating. The per therm Demand Charge shall be equal to the unit Demand Charge applicable to the Company's firm industrial rate schedules.

Input shall be based upon individual Customer's applicable gas equipment rating in:

$$\frac{\text{BTU/Hour x 10 hours}}{\text{100,000 BTU}} = \text{TH}$$

EFFECTIVE: March 1, 2012

SERVICE AGREEMENTS
All Customers purchasing gas pursuant to this schedule shall be subject to the Company's standard contracts and/or service applications and subject to the Company's Service Regulations as filed with the TRA.

PAYMENT TERMS
All bills for service are due upon presentation and the net rates are applicable if payment is made on or before the last date of payment stated on the bill. Payments made after that date shall be for the gross amount which is greater by five percent (5%) than the net billing.

RETURNED CHECK CHARGE
In the event a Customer's check for payment is returned to the Company marked NSF (Non Sufficient Funds) the Customer will be assessed a charge of $20.00.

ADJUSTMENTS
Bills for service are subject to adjustment caused by changes in the cost of purchased gas in accordance with Rule No. 1220-4-1-.12 of the TRA Rules and Regulations and the operation of Rate Schedule 316. S

Purchased gas adjustments and all applicable taxes and fees are in addition to the above stated margin rates in accordance with The Rules, Regulations and Orders of the TRA and Laws of the State of Tennessee.

SERVICE AVAILABILITY
All requests for new and additional service or the transfer of existing service to higher priority end use will be considered based upon the Company's judgment as to the available gas supply, Customer's load factor or use pattern, end use, impact on the local economy, Company's Service Regulations, and The Rules, Regulations, and Orders of the TRA and Laws of the State of Tennessee. N

SERVICE INTERRUPTION AND CURTAILMENT
Gas service under this schedule is subject to the provisions contained within TRA Schedule No. 306, "Schedule for Limiting and Curtailing Service" and the Company's Service Regulations. S

WEATHER NORMALIZATION ADJUSTMENT
Gas service under this schedule is subject to the provisions contained within TRA Schedule No. 315, "Weather Normalization Adjustment Rider."

APPLICABLE DOCUMENTS DEFINING OBLIGATIONS OF THE COMPANY AND ITS CUSTOMERS
The applicable documents defining the obligations of the Company and its Customers are those described in Section 1 of the Company's Service Regulations. N

RATE SCHEDULE NO. 302
Small General Service

AVAILABILITY

Gas Service under this Rate Schedule is available in the area served by the Company in the State of Tennessee to any full requirements non-residential Customer, upon application to and consent by the Company to such Service, as provided in the Company's Service Regulations, whose average daily usage is less than 20 dekatherms per day. Average daily gas usage will be based on the Customer's usage during the most recent past calendar year ended on December 31. Availability of this Rate Schedule for new Customers or for Customers without at least one full year of usage history will be based on reasonably anticipated usage. N

CHARACTER OF SERVICE

The nature of Service provided by Company to Customer under this Rate Schedule is firm sales Service. Any reclassification or change in quantity or character of Service to Customer will be subject to procedures set forth in the Company's Service Regulations. N

MARGIN RATE	Winter (November-March)	Summer (April-October)	
Monthly Charge	$44.00	$44.00	I
Commodity Charge (per therm)	$.35400	$.30000	R

MONTHLY CHARGE

A charge will be billed monthly to all Customers for the availability of gas service. This charge will be in addition to the Commodity Charge for gas delivered. The Monthly Charge will be billed from the date of initial service until service is terminated at the Customer's request. T

COMMODITY CHARGE

The rate per therm shall be billed on the quantity of gas delivered by Company to Customer's premises. N

BACKUP SERVICE

When gas service is being supplied for use as a Backup Service for the dual-fuel heat pump or for similar use where the Customer's equipment is specifically designed by the manufacturer or is modified by the Customer or others for the purpose of using natural gas as the equipment's backup energy source, there shall be payable monthly in addition to all and other charges under this Rate Schedule a Backup Service Demand Charge individually determined for each Customer based upon the Customer's applicable gas equipment input rating. The per therm Demand Charge shall be equal to the unit Demand Charge applicable to the Company's firm industrial rate schedules.

EFFECTIVE: March 1, 2012

Input shall be based upon individual Customer's applicable gas equipment rating in:

$$\frac{\text{BTU/Hour x 10 hours}}{\text{100,000 BTU}} = \text{TH}$$

SERVICE AGREEMENTS
All Customers purchasing gas pursuant to this schedule shall be subject to the Company's standard contracts and/or service applications and subject to the Company's Service Regulations as filed with the TRA.

PAYMENT TERMS
All bills for service are due upon presentation and the net rates are applicable if payment is made on or before the last date of payment stated on the bill. Payments made after that date shall be for the gross amount which is greater by five percent (5%) than the net billing.

RETURNED CHECK CHARGE
In the event a Customer's check for payment is returned to the Company marked NSF (Non Sufficient Funds) the Customer will be assessed a charge of $20.00.

ADJUSTMENTS
Bills for service are subject to adjustment caused by changes in the cost of purchased gas in accordance with Rule No. 1220-4-1-.12 of the TRA Rules and Regulations and the operation of Rate Schedule 316. S

Purchased gas adjustments and all applicable taxes and fees are in addition to the above stated margin rates in accordance with The Rules, Regulations and Orders of the TRA and Laws of the State of Tennessee.

SERVICE AVAILABILITY
All requests for new and additional service or the transfer of existing service to higher priority end use will be considered based upon the Company's judgment as to the available gas supply, Customer's load factor or use pattern, end use, impact on the local economy, Company's Service Regulations, and The Rules, Regulations, and Orders of the TRA and Laws of the State of Tennessee. N

SERVICE INTERRUPTION AND CURTAILMENT
Gas service under this schedule is subject to the provisions contained within TRA Schedule No.306, "Schedule for Limiting and Curtailing Service" and Company's Service Regulations. S

WEATHER NORMALIZATION ADJUSTMENT
Gas service under this schedule is subject to the provisions contained within TRA Schedule No. 315, "Weather Normalization Adjustment Rider."

APPLICABLE DOCUMENTS DEFINING OBLIGATIONS OF THE COMPANY AND ITS CUSTOMERS
The applicable documents defining the obligations of the Company and its Customers are those described in Section 1 of the Company's Service Regulations. N

EFFECTIVE: March 1, 2012

RATE SCHEDULE NO. 303
Large General Sales Service

AVAILABILITY

Gas service under this Rate Schedule is available in the area served by the Company in the State of Tennessee to any full requirements non-residential Customer whose average daily gas usage is reasonably anticipated to equal or exceed 500 therms per day. All Service under this Rate Schedule shall be contingent upon application to and consent by the Company to such Service, as provided in the Company's Service Regulations. Upon commencement of Service under this Rate Schedule, any reclassification or change in quantity or character of Service to Customer shall be subject to the provisions of this Rate Schedule 303 and the procedures set forth in the Company's Service Regulations. Service under this Rate Schedule is contingent upon the installation by the Company of telemetering equipment that reports daily consumption. N

CHARACTER OF SERVICE

The nature of Service provided by Company to Customer under this Rate Schedule is firm sales Service. N

Once a qualified Customer elects service under this Rate Schedule, all services will be provided under the terms and conditions of this Rate Schedule for a term extending through the following May 31. Upon meeting the qualifications contained therein, a Customer may receive service under Rate Schedule 309 concurrent with service provided under the Rate Schedule. Subject to the requirements set forth above, a Customer may, subject to the consent of the Company, elect to discontinue service under this Rate Schedule and receive service under Rate Schedule No.313 by giving written notice to the Company prior to March 1 of any year. The Company will not withhold such consent provided (a) the Company continues to offer large general transportation Service under Rate Schedule 313, (b) the Company is able to provide Service under Rate Schedule 313 under commercially reasonable terms and conditions, and (c) the analyses applicable to reclassifications or changes in Service set forth in the Company's Service Regulations support such consent. If timely notice is received from Customer and consent is provided by Company, the Customer shall discontinue service under this Rate Schedule and Company shall provide Service under Rate Schedule 313 effective the first June 1 following the notice. N

All gas delivered pursuant to this Rate Schedule shall be metered by the Company separately from any gas delivered to Customer under any of the Company's other Rate Schedules.

MARGIN RATE

Monthly Charge	$800.00	I
Demand Charge (per therm of billing demand)	$.80000	
Commodity Charge (per therm)		
1st Step (0-15,000 therms)	$.09682	R
2nd Step (15,001-40,000 therms)	$.08953	
3rd Step (40,001-90,000 therms)	$.06450	
4th Step (Over 90,000 therms)	$.02764	

EFFECTIVE: March 1, 2012

MONTHLY MINIMUM BILL
The minimum monthly bill shall be the Monthly Charge plus the monthly Demand Charge.

MONTHLY CHARGE
A charge will be billed monthly to all Customers for the availability of gas service. This charge will be in addition to the Commodity Charge. The Monthly Charge will be billed from the date of initial service until service is terminated at the Customer's request. T

BILLING DEMAND
The billing demand shall be determined as follows:

A Customer's billing demand determinant shall be the highest daily usage during the period from November 1 to March 31 of the previous winter period as metered and reported to the Company by the telemetering equipment installed by the Company. Changes to the Customer's billing demand determinant will become effective June 1 of each year. The per unit demand charge may be adjusted from time to time to reflect rate changes, including, but not limited to, a general change in system rates or a change in pipeline capacity charges billed to the Company.

For Customers commencing initial gas service under this Rate Schedule and who do not have a consumption history from other services provided by the Company, the billing demand determinant shall be the greater of: 1) the month of highest consumption for the period to date multiplied by six percent (6%), or 2) 500 therms. If a Customer has received gas service from the Company prior to receiving service under this rate schedule, but does not have daily telemetered records to determine peak day usage as described above, the Company shall determine a billing demand based upon the highest monthly level of consumption during the previous winter period multiplied by six percent (6%).

COMMODITY CHARGE
The rate per therm shall be billed on the quantity of gas delivered by Company to Customer's premises. N

SERVICE AGREEMENTS
All Customers purchasing gas under this Rate Schedule shall be subject to the Company's standard contracts and/or service applications and subject to the Company's Rules and Regulations as filed with the TRA.

PAYMENT TERMS
All bills for service are due upon presentation and the net rates are applicable if payment is made on or before the last date of payment stated on the bill. Payments made after that date shall be for the gross amount which is greater by five percent (5%) than the net billing.

RETURNED CHECK CHARGE
In the event a Customer's check for payment is returned to the Company marked NSF (Non Sufficient Funds) the Customer will be assessed a charge of $20.00.

ADJUSTMENTS
Bills for service are subject to adjustment caused by changes in the cost of purchased gas in accordance with Rule No. 1220-4-1-12 of the TRA Rules and Regulations and the operation of Rate Schedule 316. S

EFFECTIVE: March 1, 2012

Purchased gas adjustments and all applicable taxes and fees are in addition to the above stated margin rates in accordance with The Rules, Regulations and Orders of the TRA and Laws of the State of Tennessee.

SERVICE AVAILABILITY

All requests for new or additional service or the transfer of existing service to a higher priority end use will be considered based upon the Company's judgment as to the available gas supply, Customer's load factor or use pattern, end use, impact on the local economy, Company's Service Regulations, and The Rules, Regulations, and Orders of the TRA and Laws of the State of Tennessee. N

SERVICE INTERRUPTION AND CURTAILMENT

Gas service under this schedule is subject to the provisions contained within TRA Rate Schedule No.306, "Schedule for Limiting and Curtailing Service" and Company's Service Regulations. S

APPLICABLE DOCUMENTS DEFINING OBLIGATIONS OF THE COMPANY AND ITS CUSTOMERS

The applicable documents defining the obligations of the Company and its Customers are those described in Section 1 of the Company's Service Regulations. N

EFFECTIVE: March 1, 2012

RATE SCHEDULE NO. 304
Interruptible General Sales Service

AVAILABILITY

Gas service under this rate schedule is available in the area served by the Company in the State of Tennessee **ON AN INTERRUPTIBLE BASIS** to any full requirements non-residential Customer whose average daily gas usage is reasonably anticipated to equal or exceed 500 therms per day. All Service under this Rate Schedule shall be contingent upon application to and consent by the Company to such Service, as provided in the Company's Service Regulations. Upon commencement of Service under this Rate Schedule, any reclassification or change in quantity or character of Service to Customer shall be subject to the provisions of this Rate Schedule 304 and the procedures set forth in the Company's Service Regulations. Service under this Rate Schedule is contingent upon the installation by the Company of telemetering equipment that reports daily consumption. N

CHARACTER OF SERVICE

The nature of Service provided by the Company to Customer under this Rate Schedule is interruptible sales service. N

Once a qualified Customer elects service under this Rate Schedule, all services will be provided under the terms and conditions of this Rate Schedule for a term extending through the following May 31. Upon meeting the qualifications contained therein, a Customer may receive service under Rate Schedule 309 concurrent with service provided under this Rate Schedule. Subject to the requirements set forth above, a Customer may, subject to the consent of the Company, elect to discontinue service under this Rate Schedule and receive service under Rate Schedule 314 by giving written notice to the Company prior to March 1 of any year. The Company will not withhold such consent provided (a) the Company continues to offer large general transportation Service under Rate Schedule 313, (b) the Company is able to provide Service under Rate Schedule 313 under commercially reasonable terms and conditions, and (c) the analyses applicable to reclassifications or changes in Service set forth in the Company's Service Regulations support such consent. If timely notice is received from Customer and consent is provided by Company, the Customer shall discontinue service under this Rate Schedule and Company shall provide Service under Rate Schedule 314 effective the first June 1 following the notice. N

Customers purchasing gas pursuant to this schedule shall maintain, in useable condition, alternate-fuel facilities with ample on-site alternate fuel capability for supplying 100% of the establishment's gas requirements during periods of gas interruption or curtailment. Such interruption or curtailment shall be immediately effective upon verbal or written notification by the Company, and Customer shall refrain from using gas until permitted to do so by the Company. It is understood and agreed that the Company will have the right to suspend gas service without further notice to the Customer in the event Customer fails to curtail Customer's use of gas in accordance with the Company's notice of curtailment.

All gas delivered pursuant to this Rate Schedule shall be metered by the Company separately from any gas delivered to Customer under any of the Company's other Rate Schedules. N

Reclassification of customers between rate schedules will be based upon procedures set forth in the Company's Service Regulations as approved by the Tennessee Regulatory Authority.

EFFECTIVE: March 1, 2012

MARGIN RATE

Monthly Charge	$800.00	I
Commodity Charge (per therm)		
1st Step (0-15,000 therms)	$.09682	R
2nd Step (15,001-40,000 therms)	$.08953	
3rd Step (40,001-90,000 therms)	$.06450	
4th Step (Over 90,000 therms)	$.02764	

MONTHLY MINIMUM BILL
The minimum monthly bill shall be the Monthly Charge.

MONTHLY CUSTOMER CHARGE
A charge will be billed monthly to all Customers for the availability of gas service. This charge will be in addition to the Commodity Charge for gas delivered. The Monthly Charge will be billed from the date of initial service until service is terminated at the Customer's request. T

COMMODITY CHARGE
The rate per therm shall be billed on the quantity of gas delivered by Company to Customer. N

SERVICE AGREEMENTS
All Customers purchasing gas pursuant to this schedule shall be subject to the Company's standard contracts and/or service applications and subject to the Company's Rules and Regulations as filed with the TRA.

PAYMENT TERMS
All bills for service are due upon presentation and the net rates are applicable if payment is made on or before the last date of payment stated on the bill. Payments made after that date shall be for the gross amount which is greater by five percent (5%) than the net billing.

RETURNED CHECK CHARGE
In the event a Customer's check for payment is returned to the Company marked NSF (Non Sufficient Funds) the Customer will be assessed a charge of $20.00.

ADJUSTMENTS
Bills for service are subject to adjustment caused by changes in the cost of purchased gas in accordance with Rule No. 1220-4-1-.12 of the TRA Rules and Regulations and the operation of Rate Schedule 316. S

Purchased gas adjustments and all applicable taxes and fees are in addition to the above stated margin rates in accordance with The Rules, Regulations and Orders of the TRA and Laws of the State of Tennessee.

SERVICE AVAILABILITY
All requests for new and additional service or the transfer of existing service to higher priority end use will be supplied based upon the Company's judgment as to the available gas supply, Customer's load N

factor or use pattern, end use, impact on the local economy, Company's Service Regulations and The Rules, Regulations, and Orders of the TRA and Laws of the State of Tennessee.

SERVICE INTERRUPTION AND CURTAILMENT

Gas service under this schedule is subject to the provisions contained within TRA Schedule No. 306, "Schedule for Limiting and Curtailing Service" and the Company's Service Regulations. S

APPLICABLE DOCUMENTS DEFINING OBLIGATIONS OF THE COMPANY AND ITS CUSTOMERS N

The applicable documents defining the obligations of the Company and its Customers are those described in Section 1 of the Company's Service Regulations.

EFFECTIVE: March 1, 2012

SERVICE SCHEDULE NO. 306
Schedule for Limiting and Curtailing Service

This Service Schedule defines the types of curtailment that the Company may invoke from time to time due to the occurrence of extreme weather conditions, operating conditions or force majeure events, and describes the process and procedures to be followed in the implementation of gas service restrictions.

DISTRIBUTION PRESSURE CURTAILMENTS

Due to extreme weather conditions, operating conditions or force majeure events as defined in the Company's Tennessee Service Regulations, Rules and Regulations Governing Supply and Consumption of Gas, or the demands of the Company's firm Customers as the same may effect the Company's ability to provide interruptible service, the Company may experience localized pressure deficiencies. During such times and within the areas affected, the Company will curtail service to interruptible Customers served under Rate Schedule No. 304, Rate Schedule No.309, or Rate Schedule 314, by priority of their margin contribution to the Company (curtailing Customers with the lowest margin rate first) until the pressure situation can be alleviated. In the unlikely event that further interruption is required, the Company will proceed with curtailment by margin contribution considering end use, impact on the local economy, and The Rules, Regulations, and Orders of the TRA and Laws of the State of Tennessee.

SUPPLY OR CAPACITY RELATED CURTAILMENTS

In situations when supply and capacity services contracted by the Company are not sufficient to meet the full requirements of Customers desiring sales services from the Company, the Company will first curtail service to interruptible sales Customers receiving service under Rate Schedule No. 304 by priority of their margin contribution to the Company. Customers receiving discounted sales service under Rate Schedule No. 309 will also be curtailed according to the discounted rates. The Company reserves the right at the Company's discretion to purchase quantities being delivered to the Company by Customers under Rate Schedule 314 at market prices in order to serve Customers without operable alternative fuel capability. In the unlikely event that further interruption is required, the Company will proceed with curtailment by margin contribution considering end use, impact on the local economy, and The Rules, Regulations, and Orders of the TRA and Laws of the State of Tennessee.

EMERGENCY SERVICE

The Company will make every reasonable effort to deliver plant protection volumes to industrial and commercial Customers that do not have standby fuel systems sufficient to prevent damage to facilities or danger to personnel, or to Customers that find it impossible to continue operations on the Customer's standby or alternate energy source as a result of a bona fide existing or threatened emergency. This includes the protection of such existing material in process that would otherwise be destroyed, or deliveries required to maintain plant production. All emergency gas service is of a discretionary nature and implies no present or future obligation of the Company to any Customer to provide such service on either a temporary or continuing basis. Deliveries of gas hereunder shall be made pursuant only to advance operating arrangements between the Company's authorized personnel and the Customer and shall be subject to curtailment and interruption at any time should the Company deem it necessary.

RATE FOR EMERGENCY SERVICE

If the Company has authorized the Customer to consume limited quantities of emergency gas as provided in the above paragraph, then all gas consumed by the Customer will be at a rate of $1.00 per therm plus the higher of two gas commodity indices, "Monthly Contract" and "Daily Price", until otherwise notified that either (1) further gas sales will be under the Customer's regular rate schedule or (2) complete curtailment is unavoidable and that further gas sales will be considered unauthorized. "Monthly Contract" shall be defined as the monthly contract index price for the applicable calendar month as published in Gas Daily under the designation, "Monthly Contract Index" and indicated specifically under "Citygates" for Tenn. Zone 6 (delivered)". "Daily Price" shall be defined as the daily price for gas defined by Gas Daily as stated in the "Daily Price Survey", "Citygates", "Tenn. Zone 6 (delivered)", "Midpoint" price. For Days of consumption when the "Monthly Contract Index" is not published, the "Monthly Contract Index" shall equal the corresponding "Daily Price" published for the first day of the month of flow. For days of consumption when the "Daily Price" is not published, the "Daily Price" shall equal the average of the corresponding index prices as published on the nearest preceding and nearest subsequent day. Revenues realized from emergency service transactions will be credited to the Actual Cost Adjustment (ACA) account as recovery of gas costs. C

UNAUTHORIZED OVER RUN PENALTY

If at any time a Customer exceeds specified contract entitlements or if during any curtailment period, any affected Customer takes, without the Company's advance written approval, a volume of natural gas in excess of the curtailment period quantity entitlement applicable to such Customer, said volume shall constitute an unauthorized over run volume. For each therm of such unauthorized over run volume taken by such Customer, such Customer shall pay to the Company a rate of $1.50 per therm plus the higher of two gas commodity indices, "Monthly Contract" and "Daily Price". "Monthly Contract" shall be defined as the monthly contract index price for the applicable calendar month as published in Gas Daily under the designation, "Monthly Contract Index" and indicated specifically under "Citygates" for Tenn. Zone 6 (delivered)". "Daily Price" shall be defined as the daily price for gas defined by Gas Daily as stated in the "Daily Price Survey", "Citygates", "Tenn. Zone 6 (delivered)", "Midpoint" price. For Days of consumption when the "Monthly Contract Index" is not published, the "Monthly Contract Index" shall equal the corresponding "Daily Price" published for the first day of the month of flow. For days of consumption when the "Daily Price" is not published, the "Daily Price" shall equal the average of the corresponding index prices as published on the nearest preceding and nearest subsequent day. The Customer shall be liable for the above charges together with and in addition to any incremental charges or assessments (including, but not limited to penalties) by the interstate pipeline during the time of the unauthorized usage by such Customer. The payment of a penalty for unauthorized over run volumes shall not under any circumstances be considered as giving any such Customer the right to take unauthorized over-run volumes, nor shall such payment be considered as a substitute for any other remedies available to the Company or any other Customer against the offending Customer for failure to adhere to its obligations under the provisions of this Rate Schedule. Revenues realized from unauthorized over run penalties will be credited to the Actual Cost Adjustment (ACA) account as recovery of gas costs. C

PAYMENT TERMS

All bills for service are due upon presentation and the net rates are applicable if payment is made on or before the last date of payment stated on the bill. Payments made after that date shall be for the gross amount which is greater by five percent (5%) than the net billing.

RETURNED CHECK CHARGE

In the event a Customer's check for payment is returned to the Company marked NSF (Non Sufficient Funds) the Customer will be assessed a charge of $20.00.

ADJUSTMENTS

Bills for service are subject to adjustment caused by changes in the cost of purchased gas in accordance with Rule No. 1220-4-1-12 of the TRA Rules and Regulations and the operation of Rate Schedule 316. S

Purchased gas adjustments and all applicable taxes and fees are in addition to the above stated margin rates in accordance with The Rules, Regulations and Orders of the TRA and Laws of the State of Tennessee.

RATE SCHEDULE NO. 307
Balancing, Cash-Out, and Agency Authorization

APPLICABILITY

The provisions of this Rate Schedule 307 shall apply to all tariffed transportation services provided by the Company under Rate Schedules 313 and 314, as well as all transportation special contracts, unless expressly provided otherwise therein.

LIMITATIONS ON INTRA-MONTH IMBALANCES

Receipts and deliveries of gas hereunder shall be at uniform rates of flow with no significant fluctuations or imbalances. Customers (or its Agent) are responsible to match daily gas deliveries into the Company's system with daily gas consumption by Customer as closely as possible. Any imbalances shall be corrected by the Customer (or its Agent), insofar as practicable, during the month in which they occur. Customers (or its Agent) are expected to proactively manage intra-month imbalances. Customer (or its Agent) may adjust its daily nominations during a month in order to correct any accumulated imbalance and maintain a monthly balance subject to the operating limitations of the Company. The Company reserves the right to limit the amount of such imbalances to avoid operating problems, comply with balancing requirements of the upstream pipeline(s), and to mitigate the need to acquire additional daily supply at prices that would adversely affect sales customers. The Customer (or its Agent) will be responsible for any imbalance charges assessed by upstream pipeline(s) in connection with any gas transported by the Customer under this Rate Schedule.

In the event Customer (or its Agent) fails to abide by the requirements set forth above, the Company shall have the right to curtail deliveries to Customer (Customers in a transportation pool operated by a single Agent will be curtailed on a pro rata basis based on nominated quantities) if an imbalance is negative or reducing Customer's nominated quantities if an imbalance is positive. The Customer will be responsible for any imbalance charges assessed by upstream pipeline(s) in connection with any gas transported by the Customer. The Company reserves the right to take other reasonable action to mitigate system operational problems. The Company will use its reasonable efforts to notify the Customer or the Customer's Agent before proceeding with a unilateral nomination reduction or delivery curtailment and will notify Customer of any reduction to Customer's nomination that has been instituted by the Company. The Company reserves the right to initiate Standby Sales Service if elected by the Customer pursuant to Rate Schedule 313 when, in the judgment of the Company, such action is necessary to reduce or eliminate operational problems resulting from the gas imbalances of the Customer. The Company will use reasonable efforts to notify the Customer or the Customers' Agent before initiating Standby Sales Service hereunder. N

By 11:30 am Eastern Time on the fifth business day prior to the beginning of each month, the Customer must inform the Company of the nominating Agent for gas to be transported. If no notification to the contrary is provided, the Agent providing service during the prior month shall be deemed to be the nominating Agent by default. By 11:30 am Eastern Time on the fourth business day prior to the beginning of each month, the Customer shall submit a timely and valid nomination for transportation. Changes to nominations for gas transportation within the month are due by 11:30 am Eastern Time on the business day prior to gas flow. The Company will have no obligation to accommodate "late" or "next day intraday" or "intraday" nomination changes.

BALANCING ON UPSTREAM PIPELINE(S)

It shall be the Customer's responsibility to remain in balance on a daily and monthly basis with upstream pipeline(s) to avoid any assessment of penalties by such pipeline(s) against the Company. If the Company is assessed a penalty by an upstream pipeline, the Company shall have the right to pass-through all such penalties to the Customer or its Agent if the Customer has had an imbalance with the Company during the period for which the penalty was assessed.

MONTHLY IMBALANCE RESOLUTION

Any differences between the monthly quantities delivered to the Company's city gate facilities for the account of the Customer, and the monthly quantities consumed by the Customer as metered by the Company, shall be the monthly imbalance. The Percentage of Imbalance is defined as the monthly imbalance divided by the monthly quantities consumed by the customer. Unless the Company and Customer agree to correct imbalances "in kind," the imbalance shall be resolved monthly by "cashing out" the imbalances as they are known to exist at that time. If the Customer consumes more gas than it has delivered to the Company, the Customer will be deemed to be "short" by the amount of the deficiency, and the Company will sell the amount of the deficiency to the Customer by charging the price as specified below. If the Customer consumes less gas than has been delivered to the Company, the Customer will be deemed to be "long" by the amount of the surplus, and the Company will buy the amount of the surplus from the Customer by paying the price as specified below.

If Customer's monthly imbalance is less than or equal to 2% of the total monthly volume consumed or if the total aggregated monthly imbalance for the Agent is less than or equal to 2% of the total monthly volume consumed by all of the Agent's Customers in that transportation pool, and such imbalance or aggregated monthly imbalance is long, then the price paid by the Company will be the sum of (a) the average of the weekly "Weighted Index Price" as defined below plus (b) the pipelines Rate Schedule FT variable charges at the applicable pipeline percentages that comprise the "Weighted Index Price," including applicable fuel and surcharges, for delivery to the Company's city gate. N

If Customer's monthly imbalance is less than or equal to 2% of the total monthly volume consumed, or if the total aggregated monthly imbalance for the Agent is less than or equal to 2% of the total monthly volume consumed by all of Agent's Customers in that transportation pool, and such imbalance is short, then the price paid by the Customer (or Agent) will be the sum of (a) the average of the weekly "Weighted Index Price" as defined below plus (b) the pipelines Rate Schedule IT charges at the applicable pipeline percentages that comprise the "Weighted Index Price," including applicable fuel and surcharges, for delivery to the Company's city gate.

If the Customer (or Agent) is "short" by more than 2% of the monthly volume consumed, the price paid by the Customer (or Agent) to the Company for each dekatherm of the total deficiency will be equal to the highest "Weighted Index Price" for any week beginning in the calendar month as published in *Natural Gas Week*, plus the pipelines Rate Schedule IT charges at the applicable pipeline percentages that comprise the "Weighted Index Price," including applicable fuel and surcharges, and deliver to the Company's city gate, times the premium percentage corresponding to the percentage of the deficiency listed in the table below.

If the Customer (or Agent) is "long" by more than 2% of the monthly volume consumed, the price paid by the Company to the Customer (or Agent) for each dekatherm of the total surplus will be equal to the lowest "Weighted Index Price" for any week beginning in the calendar month as published in *Natural Gas Week*, plus the pipelines Rate Schedule FT variable charges, including

applicable fuel and surcharges, at the applicable pipeline percentages that comprise the "Weighted Index Price" and deliver to the Company's city gate, times the premium percentage corresponding to the percentage of the deficiency listed in the table below.

Percentage of the Imbalance	Short (Premium)	Long (Discount)
Over 2% & equal to or less than 5%	110%	90%
Over 5% & equal to or less than 10%	120%	80%
Over 10% & equal to or less than 15%	130%	70%
Over 15% & equal to or less than 20%	140%	60%
Over 20%	150%	50%

The "Weighted Index Price" shall be derived from the prices published in *Natural Gas Week* in the table Natural Gas Weekly Spot Prices for the following pipeline designations and weighted by the corresponding percentages set forth below:

TEXAS (SOUTH/EAST), Tenn Zone 0	X	.3028
+		
GULF COAST, Tenn 500 So LA Z1	X	.3806
+		
GULF COAST, Tenn 800 So LA Z1	X	.3166[1]

If an index listed in the table above fails to publish, the Company will use an average of the published corresponding Gas Daily indexes for the corresponding dates not published in Natural Gas Week. N

The Company will collect gross receipts tax on the incremental gas related charges.

Any difference between the actual cost of gas incurred by the Company and the Index price as defined in the previous paragraph will be accounted for in the Actual Cost Adjustment account in a manner consistent with Rule No. 1220-4-1-12 of the TRA Rules and Regulations. Increments or decrements which may result from the PGA adjustments will not apply to the cash-out of imbalances.

AGENCY AUTHORIZATION FORM

Certain Rate Schedules permit a Customer to appoint a Customer's Agent to act on its behalf with respect to nominations, imbalance resolution, and/or billing. Customer shall authorize a Customer's Agent by executing an Agency Authorization Form in the form attached to this Rate Schedule. In order to be considered a Customer's Agent, a third party must execute and be in compliance with all of the terms of the Customer Agent Agreement form set forth in Appendix A to the Company's Service Regulations. To the extent that the Agent appointed by the Customer is common to other Customers of the Company, the Company will permit such Agent to aggregate all such qualifying Customers' transportation quantities for purposes of administering service to such Agent. Once a Customer has designated an Agent, the Agent is then authorized to act on behalf of that Customer and as such, the Agent will be considered as the Customer in all corresponding references contained within this Rate Schedule. The Customer may not change

[1] These percentages are the ratio of the Company's Tennessee Gas Pipeline contract winter capacity in effect at the time of the Company's most recent general rate case.

Agents within the calendar month without the permission of the Company, unless the Agent's right to conduct business on the Company's system has been suspended by the Company, in which case, the Customer may act without an Agent or may provide written notice to the Company of the new Customer's Agent designated by the Customer. The Company will provide reasonable notice to Customer in the event of any suspension of Customer's Agent and will provide copies to Customer, on an expeditious basis and by electronic or other means, of any formal notices issued to the Customer's Agent. All Agents must utilize the electronic means made available by the Company in order to submit nominations. The Company may recover from the Agent all costs incurred in providing the Agent access to the electronic bulletin board. N

APPLICABLE DOCUMENTS DEFINING OBLIGATIONS OF THE COMPANY AND ITS CUSTOMERS

The applicable documents defining the obligations of the Company and its Customers are those described in Section 1 of the Company's Service Regulations.

RATE SCHEDULE NO. 307
Balancing, Cash-Out, and Agency Authorization

AGENCY AUTHORIZATION FORM

EFFECTIVE DATE _____

CUSTOMER _____

NAME OF FACILITY _____

ACCOUNT NUMBER (S) _____

AGENT _____

AGENT CONTACT _____

AGENT PHONE # _____

This is to advise Piedmont Natural Gas Company that _____**(Customer)** has authorized _____**(Agent)** to act on its behalf for the following transactions:

_____nominations.
_____imbalance resolution.
_____billing.

of gas for the above listed account(s). Piedmont Natural Gas Company is hereby authorized to deal with the Agent directly, and the **CUSTOMER AND THE AGENT UNDERSTAND THAT THEY ARE RESPONSIBLE, JOINTLY AND SEVERALLY, FOR ANY AMOUNTS DUE PIEDMONT NATURAL GAS COMPANY ARISING UNDER THIS RATE SCHEDULE, PIEDMONT'S TENNESSEE SERVICE REGULATIONS, OR AGENT'S CUSTOMER AGENT AGREEMENT** which are not paid on these accounts. Customer will provide Piedmont Natural Gas Company with a revised "AGENCY AUTHORIZATION FORM" at least five (5) business days prior to the beginning of the month for the accounts designated, unless the Agent's right to conduct business has been suspended by Piedmont Natural Gas Company without prior notice.

M

_____
CUSTOMER AUTHORIZED SIGNATURE

_____
AGENT AUTHORIZED SIGNATURE

Please Print:

AGENT'S NAME_____TITLE _____

PHONE #_____FAX #_____

MAILING ADDRESS
Please submit to: End User Transportation
Piedmont Natural Gas Company
P. O. Box 33068
Charlotte, N.C. 28233

OR

End User Transportation
Fax Number: (704) 364-8320

RATE SCHEDULE NO. 309
Special Availability Service

AVAILABILITY

Gas service under this rate schedule is available to any TRA Rate Schedule No. 303,304, 313, or 314, Customer when the Company has gas supplies or services that it cannot sell at its established fixed rates where the Company's distribution mains are suitable for supplying the desired service. On such occasions, the opportunity is lost to the Company and its Customers. This Rate Schedule is designed to permit the Company to sell such gas and services at special rates for the purpose of enabling the Company to compete with alternative fuels and services available for use by its Customers.

Gas service under this Rate Schedule is available on a limited term basis to Customers who are connected to the Company's distribution system and would otherwise qualify for commercial and industrial sales or transportation service. Gas service may be provided under this Rate Schedule only in the event that the Company has available supplies or services that cannot competitively be provided under other rate schedules. Service under this Rate Schedule is temporary and the Company has the right to discontinue such service. Gas service under this rate schedule will be curtailed prior to service under any other comparable rate schedule.

In the event a Customer has zero consumption during any billing month, this tariff will not apply and service shall be rendered pursuant to the Company's regular rate schedules for the class of service indicated for the purpose of determining a minimum bill and qualifying provisions.

BASE RATE

The Customer shall pay the Company for all gas supplied or services provided under this schedule at a predetermined rate negotiated prior to delivery for limited term periods up to seven consecutive months.

SERVICE AGREEMENTS

All Customers purchasing gas pursuant to this Rate Schedule shall be subject to the Company's standard contracts and/or service applications and subject to the Company's Service Regulations as filed with the TRA.

PAYMENT TERMS

All bills for service are due upon presentation and the above stated net rates are applicable if payment is made on or before the last date of payment stated on the bill. Payments made after that date shall be for the gross amount which is greater by five percent (5%) than the net billing.

RETURNED CHECK CHARGE

In the event a Customer's check for payment is returned to the Company marked NSF (Non Sufficient Funds) the Customer will be assessed a charge of $20.00.

ADJUSTMENTS

Bills for service are subject to adjustment caused by changes in the cost of purchased gas in accordance with Rule No. 1220-4-1-.12 of the TRA Rules and Regulations and the operation of Rate Schedule 316.

EFFECTIVE: March 1, 2012

Purchased gas adjustments and all applicable taxes and fees are in addition to the above stated base rates in accordance with The Rules, Regulations and Orders of the TRA and Laws of the State of Tennessee.

SERVICE AVAILABILITY

All requests for new and additional service or the transfer of existing service to higher priority end use will be supplied based upon the Company's judgment as to the available gas supply, Customer's load factor or use pattern, end use priority as specified by the Federal Energy Regulatory Commission (FERC), impact on the local economy, Company's Service Regulations, and The Rules, Regulations, and Orders of the TRA and Laws of the State of Tennessee. N

SERVICE INTERRUPTION AND CURTAILMENT

Gas service under this schedule is subject to the provisions contained within TRA Schedule No. 306, "Schedule for Limiting and Curtailing Service" and the Company's Service Regulations. S

TREATMENT OF NEGOTIATED MARGIN LOSSES

Margin losses under this rate schedule shall be recovered by the Company through the Company's Actual Cost Adjustment (ACA) as provided in the Company's Purchased Gas Adjustment (PGA) Rider (TRA Service Schedule No. 311).

RATE SCHEDULE NO. 310
Resale Service

AVAILABILITY
Sales for Resale Service is available under this rate schedule to any qualified local distribution company who purchases natural gas for the purpose of reselling same, where the Company's distribution mains are suitable for supplying the desired service.

CHARACTER OF SERVICE
The nature of Service provided by Company to Customer under Rate Schedule 310 is firm sales for resale Service. N

MARGIN RATE

Demand Charge (per therm of billing demand)	$.80000
Commodity Charge (per therm)	$.09000

MONTHLY MINIMUM BILL
The minimum monthly bill shall be the monthly demand charge.

BILLING DEMAND
Demand determinants shall be those agreed to in the contract.

COMMODITY CHARGE
The rate per therm shall be billed on the quantity of gas delivered by Company to Customer's premises.

SERVICE AGREEMENTS
All customers purchasing gas pursuant to this schedule shall be subject to the Company's standard contracts and/or service applications and subject to the Company's Rules and Regulations as filed with the TRA.

PAYMENT TERMS
All bills for service are due upon presentation and the net rates are applicable if payment is made on or before the last date of payment stated on the bill. Payments made after that date shall be for the gross amount which is greater by five percent (5%) than the net billing.

RETURNED CHECK CHARGE
In the event a customer's check for payment is returned to the Company marked NSF (Non Sufficient Funds) the customer will be assessed a charge of $20.00.

EFFECTIVE: March 1, 2012

ADJUSTMENTS

Bills for service are subject to adjustment caused by changes in the cost of purchased gas in accordance with Rule No. 1220-4-1-.12 of the TRA Rules and Regulations and the operation of Rate Schedule 316. Purchased gas adjustments and all applicable taxes and fees are in addition to the above stated margin rates in accordance with The Rules, Regulations and Orders of the TRA and Laws of the State of Tennessee. S

SERVICE AVAILABILITY

All requests for new and additional service or the transfer of existing service to higher priority end use will be supplied based upon the Company's judgement as to the available gas supply, customer's load factor or use pattern, end use priority as specified by the Federal Energy Regulatory Commission (FERC), impact on the local economy, Company's Service Regulations, and The Rules, Regulations, and Orders of the TRA and Laws of the State of Tennessee. N

SERVICE INTERRUPTION AND CURTAILMENT

Gas service under this schedule is subject to the curtailment provisions contained within TRA Schedule No. 306, "Schedule for Limiting and Curtailing Service" and Company's Service Regulations. S

APPLICABLE DOCUMENTS DEFINING OBLIGATIONS OF THE COMPANY AND ITS CUSTOMERS

The applicable documents defining the obligations of the Company and its Customers are those described in Section 1 of the Company's Service Regulations. N

EFFECTIVE: March 1, 2012

SERVICE SCHEDULE NO. 311
Purchased Gas Adjustment Rider

I. General Provisions.

A. This Purchased Gas Adjustment (PGA) Rider is intended to permit the Company to recover, in a timely fashion, the total cost of gas purchased for delivery to its customers and to assure that the Company does not over-collect or under-collect Gas Costs from its customers.

B. This Rider is intended to apply to all Gas Costs incurred in connection with the purchase, transportation and/or storage of gas purchased for general system supply, including, but not limited to, natural gas purchased from interstate pipeline transmission companies, producers, brokers, marketers, associations, intrastate pipeline transmission companies, joint ventures, providers of liquefied natural gas (LNG), liquefied petroleum gas (LPG), substitute, supplemental or synthetic natural gas (SNG), and other hydrocarbons used as feed-stock, other distribution companies and end-users, whether or not the Gas Costs are regulated by the Federal Energy Regulatory Commission and whether or not the provider of the gas, transportation or storage is affiliated with the Company.

C. To the extent practicable, any revision in the PGA shall be filed with the Authority no less than thirty (30) days in advance of the proposed effective date and shall be accompanied by the computations and information required by this Rider. It is recognized, however, that in many instances the Company receives less than 30 days notice from its Suppliers and that other conditions may exist which may prevent the Company from providing 30 days advance notice. Therefore, should circumstances occur where information necessary for the determination of an adjustment under this Rider is not available to the Company so that the thirty (30) days requirement may be met, the Company may, upon good cause shown, be permitted to place such rates into effect with shorter advance notice. T

D. The rates for gas service set forth in all of the Rate Schedules of the Company shall be adjusted pursuant to the terms of the PGA, or any specified portion of the PGA as determined by individual Rate Schedule(s).

E. No provision of this Rider shall supersede any provision of a Special Contract approved by the Authority. T

II. Definitions.

A. "Gas Costs" shall mean the total delivered cost of gas paid or to be paid to Suppliers, including, but not limited to, all commodity/gas charges, demand charges, peaking charges, surcharges, emergency gas purchases, over-run charges, capacity charges, standby charges, gas inventory charges, minimum bill charges, minimum take charges, take-or-pay charges and take-and-pay charges (except as provided below), storage charges, service fees and transportation charges and any other similar charges which are paid by the Company to its gas suppliers in connection with the purchase, storage or transportation of gas for the Company's system supply, including Company use and lost and unaccounted for gas. C

B. **"Fixed Gas Costs"** shall mean all Gas Costs based on the Company's right to demand gas or transportation on a daily or seasonal peak; but unless otherwise ordered by the Authority, shall not include other charges paid for gas reserve dedication (e.g., reservation fees and gas inventory charges), minimum bill charges, minimum take charges, over-run charges, emergency gas charges, take-or-pay charges or take-and-pay charges (all of which shall be considered commodity costs). T

C. **"Gas Charge Adjustment"** shall mean the per unit amount billed by the Company to its customers solely for Gas Costs. The Gas Charge Adjustment shall be separately stated for firm customers and for non-firm customers.

D. **"Suppliers"** shall mean any person or entity, including affiliates of the Company, who locates, purchases, sells, stores and/or transports natural gas or its equivalent for or on behalf of the Company. Suppliers may include, but not be limited to, interstate pipeline transmission companies, producers, brokers, marketers, associations, intrastate pipeline transmission companies, joint ventures, providers of LNG, LPG, SNG, and other hydrocarbons used as feed-stock, other distribution companies and end-users.

E. **"Computation Period"** shall mean the twelve (12) month period utilized to compute Gas Costs. Such period shall be the twelve (12) month period ending on the last day of a month which is no more than 62 days prior to the filing date of a PGA.

F. **"Demand Billing Determinants"** shall mean the annualized volumes for which the Company has contracted with Suppliers as of the first day of the Filing Month.

G. **"Commodity Billing Determinants"** shall mean the total metered throughput, regardless of source, during the Computation Period, adjusted for known and measurable changes. Should the Company expect to purchase commodity gas from several Suppliers, the Company shall allocate to each supplier a percentage of the total metered throughput, regardless of source, during the Computation Period, adjusted for known and measurable changes. The percentage used to allocate among Suppliers shall be based on historical takes during the Computation Period, if appropriate; otherwise it shall be based upon the best estimate of the Company.

H. **"Filing Month"** shall mean the month in which a proposed revision is to become effective.

III. Computation and Application of the PGA.

The PGA shall consist of three major components: (1) the Gas Charge Adjustment; (2) the Refund Adjustment; and (3) the Actual Cost Adjustment (ACA).

A. Computation of Gas Charge Adjustment.

The Company shall compute the jurisdictional Gas Charge Adjustment at such time that the Company determines that there is a significant change in its Gas Costs.

1. **Formulas.** The following formulas shall be used to compute the Gas Charge Adjustment:

$$Firm\ GCA = \left[\left(\frac{D \pm DACA}{SF}\right) - DB\right] + \left[\left(\frac{P + T + SR \pm CACA}{ST}\right) - CB\right]$$

$$Non\text{-}Firm\ GCA = \left(\frac{P + T + SR \pm CACA}{ST}\right) - CB$$

1. Definitions of Formula Components.

GCA = The Gas Charge Adjustment in dollars per Ccf/Therm, rounded to no more than five decimal places.

D = The sum of all fixed Gas Costs.

DACA = The demand portion of the ACA.

P = The sum of all commodity/gas charges.

T = The sum of all transportation charges.

SR = The sum of all FERC approved surcharges.

CACA = The commodity portion of the ACA.

DB = The per unit rate of demand costs or other fixed charges included in base rates in the most recently completed general rate case (which may be zero if the Company so elects and the Authority so approves). T

CB = The per unit rate of variable Gas Costs included in base rates in the most recently completed general rate case (which may be zero if the Company so elects and the Authority so approves). T

SF = Firm sales.

ST = Total sales.

2. Determination of Factors for Gas Charge Adjustment.

a. Demand Charges (Factor D)

All fixed Gas Costs that do not vary with the amount of gas purchased or transported, including, but not limited to, the product resulting from the multiplication of (1) the respective Demand Billing Determinants by (2) the

demand rates effective the first day of the Filing Month and (3) any fixed storage charges.

b. Demand Actual Cost Adjustment (Factor DACA)

See Subsection C of Section III.

c. Purchased Commodity Charges (Factor P)

All commodity or other variable gas costs associated with the amount of gas purchased or transported including, but not limited to, the product resulting from the multiplication of (1) the respective Commodity Billing Determinants by (2) the respective supplier's commodity/gas rate which are known, or if not known which are reasonably anticipated, to be in effect on the first day of the Filing Month.

d. Transportation Charges (Factor T)

The transportation charges actually invoiced to the Company during the Computation Period or expected to be invoiced to the Company during the current period.

e. FERC Approved Surcharges (Factor SR)

The sum of all FERC approved surcharges, including gas inventory charges or its equivalent, actually invoiced or expected to be invoiced to the Company during the Computation Period or to be effective the first day of the Filing Month by respective Suppliers.

f. Actual Cost Adjustment (Factor ACA)

See Subsection C of Section III.

g. Firm Sales (Factor SF)

Total volumes billed to the Company's firm customers during the Computation Period, regardless of source, adjusted for known and measurable changes.

h. Total Sales (Factor ST)

Total volumes billed to all the Company's customers during the Computation Period, regardless of source, adjusted for known measurable changes.

3. Modification of Formulas.

The formulas set forth above are not designed for use with two-part demand/commodity rate schedules; therefore, the formulas may be modified for use with such rate schedules. In addition, the formulas may be modified from time to time to carry out the intent of this PGA Rider. Any amendment to the formulas shall be effective on the proposed effective date of the amendment unless the Authority shall act to suspend the proposed amendment within

T

thirty days after the filing of the proposed amendment, in which case the proposed amendment shall be subject to notice and hearing.

4. Filing with the Authority. T

The computation of the Gas Charge Adjustment shall be filed in accordance with the notice requirements specified in Subsection C of Section I of this Rider, and shall remain in effect until a revised Gas Charge Adjustment is computed and filed pursuant to this Rider.

The Company shall file with the Authority a transmittal letter, an exhibit showing the computation of the Gas Charge Adjustment, a PGA tariff sheet, and any applicable revised tariff sheets issued by Suppliers. The transmittal letter shall state the PGA tariff sheet number, the service area(s), the primary reasons for revision, and the effective date. T

If the Company proposes to recover any Gas Costs relating to (1) any payments to an affiliate or (2) any payments to a non-affiliate for emergency gas, over-run charges, take-or-pay charges and take-or-pay charges (except as provided below) or (3) the payment of any demand or fixed charges in connection with an increase in contract demand, the Company must file with the Authority a statement setting forth the reasons why such charges were incurred and sufficient information to permit the Authority to determine if such payments were prudently made under the conditions which existed at the time the purchase decisions were made. T

Any filing of a rate change under this Rider shall be effective on the proposed effective date unless the Authority shall act to suspend the proposed change within thirty day after the filing, in which case the filing shall be subject to notice and hearing. T

The recovery of pipeline take-or-pay charges which were the subject of Docket No. U-87-7590 shall continue to be handled under procedures approved by the Authority in that docket until such time as such procedures may be modified or amended by further order of the Authority. T

B. Refund Adjustment.

The Refund Adjustment shall be separately stated for firm and non-firm customers, and may be either positive or negative.

1. Computation of Refund Adjustment.

The Company shall compute a Refund Adjustment on the last day of each calendar quarter using the following formulas:

$$Firm\ RA = \left(\frac{DR1 - DR2}{SFR}\right) + \left(\frac{CR1 - CR2 \pm CR3 \pm i}{STR}\right)$$

$$Non\text{-}Firm\ RA = \left(\frac{CR1 - CR2 \pm CR3 \pm i}{STR}\right)$$

EFFECTIVE: March 1, 2012

2. Definitions of Formula Components.

RA = The Refund Adjustment in dollars per Ccf/therm, rounded to no more than five decimal places.

DR1 = Demand refund not included in a currently effective Refund Adjustment, and received from Suppliers by check, wire transfer, or credit memo.

DR2 = A demand surcharge from a Supplier not includable in the Gas Charge Adjustment, and not included in a currently effective Refund Adjustment.

CR1 = Commodity refund not included in a currently effective Refund Adjustment, and received from Suppliers by check, wire transfer, or credit memo.

CR2 = A commodity surcharge from a supplier not includable in the Gas Charge Adjustment, and not included in a currently effective Refund Adjustment.

CR3 = The residual balance of an expired Refund Adjustment.

I = Interest on the "Refund Due Customers' Account," using the average monthly balance based on the beginning and ending monthly balances. The interest rates for each calendar quarter used to compute such interest shall be a rate 2% below the arithmetic mean (to the nearest one-hundredth of one percent) of the prime rate value published in the "Federal Reserve Bulletin" or in the Federal Reserve's "Selected Interest Rates" for the 4th, 3rd, and 2nd months preceding the lst month of the calendar quarter C

SFR = Firm sales as defined in the Gas Charge Adjustment computation, less sales under a transportation or negotiated rate schedule.

STR = Total sales as defined in the Gas Charge Adjustment computation, less sales under a transportation or negotiated rate schedule.

3. Modification of Formula.

The formulas set forth above are not designed for use with two-part demand/commodity rate schedules; therefore, the formulas may be modified for use with such rate schedules. In addition, the formulas may be modified from time to time to carry out the intent of this PGA Rider. Any amendment to the formulas shall be effective on the proposed effective date of the amendment unless the Authority shall act to suspend the proposed amendment within thirty days after the filing of the proposed amendment, in which case the proposed amendment shall be subject to notice and hearing. T

4. Filing with the Authority. T

The computation of the Refund Adjustment shall be filed in accordance with the notice requirements specified in Subsection C of Section I this Rider, and shall remain in effect for a period of twelve (12) months or for such longer or shorter period of time as required to appropriately refund the applicable refund amount.

The Company shall file with the Authority a transmittal letter, exhibits showing the computation of the Refund Adjustment and interest calculations, and a PGA tariff sheet. The transmittal letter shall state the PGA tariff sheet number, the service area(s), the reason for adjustment, and the effective date. Should the Company have a Gas Charge Adjustment filing to become effective the same date as a Refund Adjustment, a separate transmittal letter and PGA tariff sheet shall not be necessary. T

C. Actual Cost Adjustment.

Commencing with the initial effective date of this Rider, the Company shall calculate the ACA monthly. The Company may, at its option, file monthly to include the ACA in its calculation of the Gas Charge Adjustment but shall be required to do so at least annually. The ACA shall be the difference between (1) revenues billed customers by means of the Gas Charge Adjustment and (2) the cost of gas invoiced the Company by Suppliers plus margin loss (if allowed by order of the Authority in another docket) as reflected in the Deferred Gas Cost account. The balance of said account shall be adjusted for interest at the rate provided for the calculation of interest with respect to the Refund Adjustment. The ACA shall be segregated into demand and commodity, and shall be added to or deducted from, as appropriate, the respective demand and commodity costs included in the Gas Charge Adjustment. Supplemental sheets showing the calculations of margin losses and cost savings shall also be provided. T

D. Adjustments to Prior Period ACAs.

In the event that circumstances warrant a correction to or restatement of a prior period ACA, such correction or restatement shall be made in accordance with the ACA calculation in effect for the time period(s) to which the correction or restatement relates. The resulting adjustment shall then be added to or deducted from the appropriate ACA in the next ensuing ACA filing with the Authority. T

E. Annual Filing with the Authority. T

Each year, the Company shall file with the Authority an annual report reflecting the transactions in the Deferred Gas Cost Account. Unless the Authority provides written notification to the Company within 180 days, the Deferred Gas Cost Adjustment Account shall be deemed in compliance with the provisions of this Rider.

IV. Gas Cost Accounting.

To appropriately match revenues with cost of purchased gas as contemplated under this rule, the Company shall originally record the cost of purchased gas in a "Deferred Gas Cost" account. Monthly, the Company

shall debit "Natural Gas Purchases" with an amount equal to any gas cost component included in the Company's base tariff rates (base rate) plus the PGA rate, as calculated hereunder, multiplied by the appropriate sales volumes billed to customers. The corresponding monthly credit entry shall be made to the "Deferred Gas Cost" account.

SERVICE SCHEDULE NO. 312
Equal Payment Plan (EPP)

AVAILABILITY

The Equal Payment Plan ("EPP" or "Plan") is available to customers receiving service under Rate Schedules 301 and 302 whose accounts are in good standing. Good standing shall be defined as not having been removed from the Plan within the last twelve (12) months for non-payment of bills. The Plan is designed to provide the customer the option of paying equal payments over a twelve-month period and is available during any month of the year. Under circumstances where a customer has a difficult time paying his monthly bills, EPP may be used to catch up the past due balance. The customer will be asked to pay as much of the old balance as possible to help keep future payments as low as possible. N

GENERAL TERMS AND CONDITIONS

At the customer's election, the Company will calculate payments under the Plan based on the customer's actual consumption history during the past 12-months adjusted for normal weather. The estimated monthly usage will be priced at the Company's currently approved margin rates plus an estimated purchased gas adjustment factor based on the forward-looking NYMEX futures prices for upcoming 12-month period. Applicable franchise fees and sales tax are then added to arrive at the estimated annual billing amount. If the customer has an outstanding balance, it will be added to the estimated annual amount. The monthly payment will be calculated by dividing the estimated annual billing amount by twelve. After 11 payments have been made, the customer will be sent a twelfth-month "true-up" bill reflecting any underage or overage of the total of the past 11 payments. Underages will be treated as debits and overages will be treated as credits and applied to the next billing. Refunds may be made by check if the overage exceeds $25.00. Unless otherwise requested, the customer will remain on EPP after the twelfth bill with a new monthly EPP amount calculated.

MID-YEAR ADJUSTMENTS

In order to avoid unusually large debit or credit balances to the customer's account, the Company may make mid-year adjustments to the EPP payments. During periods of highly volatile wholesale gas prices, more frequent EPP adjustments may be required to avoid unusually large debit or credit balances. The Company will notify the customer with a notation on the bill, bill insert or separate mailing of any adjustments to payments.

EFFECTIVE: March 1, 2012

RATE SCHEDULE NO. 313
Firm Transportation Service

AVAILABILITY

Gas service under this Rate Schedule is available in the area served by the Company in the State of Tennessee to any full requirements non-residential Customer whose average daily gas usage is reasonably anticipated to equal or exceed 500 therms per day. All Service under this Rate Schedule shall be contingent upon application to and consent by the Company to such Service, as provided in the Company's Service Regulations. Upon commencement of Service under this Rate Schedule, any reclassification or change in quantity or character of Service to Customer shall be subject to the provisions of this Rate Schedule 313 and the procedures set forth in the Company's Service Regulations. Service under this Rate Schedule is contingent upon the installation by the Company of telemetering equipment that reports daily consumption. N

CHARACTER OF SERVICE

The nature of service provided by Company to Customer under this Rate Schedule is firm transportation Service. N

Once a qualified Customer elects service under this Rate Schedule, all services will be provided under the terms and conditions of this Rate Schedule for a term extending through the following May 31. Upon meeting the qualifications contained therein, a Customer may receive service under Rate Schedule 309 concurrent with service provided under this Rate Schedule. Subject to the requirements set forth above, a Customer may, subject to the consent of the Company, elect to discontinue service under this Rate Schedule and receive service under Rate Schedule 303 by giving written notice to the Company prior to March 1 of any year. The Company will not withhold such consent provided (a) the Company continues to offer Large General Sales Service under Rate Schedule 303, (b) the Company is able to provide Service under Rate Schedule 303 under commercially reasonable terms and conditions, and (c) the analyses applicable to reclassifications or changes in Service set forth in the Company's Service Regulations support such consent. If timely notice is received from Customer and consent is provided by Company, the Customer shall discontinue service under this Rate Schedule and Company shall provide Service under Rate Schedule 303 effective the first June 1 following the notice. N

All gas delivered to pursuant to this Rate Schedule shall be metered by the Company separately from any gas delivered to Customer under any of the Company's other Rate Schedules. N

The Company will redeliver gas received by Company from upstream pipeline(s) for the Customer's account under this Rate Schedule in accordance with the Customer's scheduled and confirmed nominations and subject to the Company's Operating Conditions. N

APPLICABILITY

Transportation service is available under this Rate Schedule to any qualified Customer connected to the Company's system who has obtained an independent supply of natural gas and has arranged to have this supply delivered to one of the Company's existing delivery points for transportation by the Company to the Customer's facilities.

The Company will deliver gas previously transported by a connected pipeline for the Customer's account under this Rate Schedule on a day-to-day basis in accordance with the

Customer's scheduled and confirmed nominations, subject to such maximum allowable daily deliveries as may be specified in the Gas Service Contract. The Company reserves the right to suspend service on any day when, in the Company's sole opinion, its operating conditions are such that suspension of service is necessary. The Company reserves the right to limit, allocate, or direct third party gas nominations among the interstate pipelines serving the Company's distribution system, when, in the Company's sole opinion, such action is necessary to maintain the operational integrity of the system.

D

STANDBY SALES SERVICE

At the option of the Customer, an election may be made monthly to receive Standby Sales Service from the Company under this Rate Schedule for delivery to the Customer at the Company's city gate. The Customer will also receive Standby Sales Service as a default if the Customer or the Customer's agent fails to submit a timely and valid nomination for transportation service. In addition to paying the Monthly Standby Index Price set forth below for Standby Sales Service hereunder, the Customer will utilize the transportation services and incur the charges otherwise applicable under this Rate Schedule to cause such gas supplies to be delivered to the Customer's meter. The price which the Customer shall pay for the gas supplied under this paragraph will be the Monthly Standby Index Price defined as follows: "The weighted average index price for the applicable month as published in the first *Natural Gas Week* for such month in the table Natural Gas Weekly Spot Prices ,for:

TEXAS (SOUTH/EAST), Tenn Zone 1 Zone 0:South Texas		X	.3028
	+		
GULF COAST, Tenn 500 So La Z1 Louisiana		X	.3806
	+		
GULF COAST, Tenn 800 So La Z1		X	.3166

C

If the Customer nominates transportation service hereunder and purchases gas supplies from a third party supplier, and such Customer's consumption exceeds actual deliveries to the Company from such third party supplier to the point where operational problems are created for the Company, then the Company shall have the right, at it sole discretion, to initiate Standby Sales Service to the Customer. The price for such service shall be the same as set forth above except when the Company is required by such imbalance shortfall to purchase incremental volumes of gas supplies. In this case the Customer receiving Standby Sales Service will pay the higher of (on a daily basis) the Monthly Standby Index Price or the Daily Standby Index Price defined as follows:

The midpoint daily index price as published in Gas Daily for the day of consumption as stated in the "Daily Price Survey," for the "Tennessee 500 Leg." For days of consumption when the Gas Daily is not published, the Gas Daily price shall equal the price as published on the nearest subsequent day by Gas Daily.

Applicable firm transportation tariff commodity charges, fuel and any other surcharges as defined in the above transporters' FERC approved tariffs will be added to the above standby index prices. The Company will collect gross receipts tax on the incremental gas related charges.

Any difference between the actual cost of gas incurred by the Company and the Index price as defined in the previous paragraph will be accounted for in the Actual Cost Adjustment account in a manner consistent with Rule No. 1220-4-1-12 of the TRA Rules and Regulations. Increments or decrements which may result from the PGA adjustments will not apply to the standby index prices.

MARGIN RATE

Monthly Charge	$800.00	I
Demand Charge (per therm of billing demand)	$.80000	
Commodity Charge (per therm)		
1st Step (0-15,000 therms)	$.09682	R
2nd Step (15,001-40,000 therms)	$.08953	
3rd Step (40,001-90,000 therms)	$.06450	
4th Step (Over 90,000 therms)	$.02764	

MONTHLY MINIMUM BILL
The minimum monthly bill shall be the Monthly Charge plus the Demand Charge multiplied by the billing demand determined as described below. T

MONTHLY CHARGE
A charge will be billed monthly to all Customers for the availability of gas service. This charge will be in addition to the Commodity Charge. The Monthly Charge will be billed from the date of initial service until service is terminated at the Customer's request. N

BILLING DEMAND
The billing demand shall be determined as follows:

Customer billing demand determinate shall be the highest daily usage during the period from November 1 to March 31 of the previous winter period as metered and reported to the Company by the telemetering equipment installed by the Company. Changes to the Customer's billing demand determinate will become effective June 1 of each year. The per unit charge may be adjusted from time to time to reflect rate changes, including, but not limited to, a general change in system rates or a change in pipeline capacity charges billed to the Company.

For Customers commencing initial gas service under this Rate Schedule and who do not have a consumption history from other services provided by the Company, the billing demand determinate shall be based upon a reasonable assumption of usage considering the connected load. If a Customer has received gas service from the Company prior to receiving service under this Rate Schedule but does not have daily telemetered records to determine peak day usage as described above, the Company shall determine a billing demand based on the greater of: 1) the month of highest consumption for the period to date multiplied by six percent (6%), or 2) 500 therms.

COMMODITY CHARGE
The rate per therm shall be billed on the quantity of gas delivered by Company to Customer's premises. N

SERVICE AGREEMENTS
All Customers receiving service under this Rate Schedule shall be required to execute the Company's standard contracts and/or service applications and shall be subject to the Company's Rules and Regulations as filed with and approved by the Tennessee Regulatory Authority (TRA).

PAYMENT TERMS
All bills for service are due upon presentation and the net rates are applicable if payment is made on or before the last date of payment stated on the bill. Payments made after that date shall be for the gross amount which is greater by five percent (5%) than the net billing.

RETURNED CHECK CHARGE
In the event a Customer's check for payment is returned to the Company marked NSF (Non Sufficient Funds) the Customer will be assessed a charge of $20.00.

ADJUSTMENTS
Bills for transportation service are subject to adjustment caused by changes in the cost of purchased gas in accordance with Rule No. 1220-4-1-.12 of the TRA Rules and Regulations.

Purchased gas adjustments and all applicable taxes and fees are in addition to the above stated margin rates in accordance with the Rules, Regulations and Orders of the TRA and the Laws of the State of Tennessee.

SERVICE AVAILABILITY
All requests for new or additional service or the transfer of existing service to a higher priority end use will be considered based upon the Company's judgment as to the available gas supply, Customer's load factor or use pattern, end use, impact on the local economy, Company's Service Regulations, the TRA Rules and Regulations, Orders of the TRA, and the Laws of the State of Tennessee. N

SERVICE CURTAILMENT
Gas service under this schedule is subject to the provisions contained within TRA Schedule No. 306, "Schedule for Limiting and Curtailing Service" and Company's Service Regulations. S

BALANCING, CASH-OUT, AND AGENCY AUTHORIZATION
Service under this Rate Schedule shall be subject to all of the provisions and requirements of Rate Schedule 307, "Balancing, Cash-Out, and Agency Authorization." N

APPLICABLE DOCUMENTS DEFINING OBLIGATIONS OF THE COMPANY AND ITS CUSTOMERS N
The applicable documents defining the obligations of the Company and its Customers are those described in Section 1 of the Company's Service Regulations.

RATE SCHEDULE NO. 314
INTERRUPTIBLE TRANSPORTATION SERVICE

AVAILABILITY

Gas service under this Rate Schedule is available in the area served by the Company in the State of Tennessee **ON AN INTERRUPTIBLE BASIS** to any full requirements non-residential Customer whose average daily gas usage is reasonably anticipated to equal or exceed 500 therms per day. All Service under this Rate Schedule shall be contingent upon application to and consent by the Company to such Service, as provided in the Company's Service Regulations. Upon commencement of Service under this Rate Schedule, any reclassification or change in quantity or character of Service to Customer shall be subject to the provisions of this Rate Schedule 314 and the procedures set forth in the Company's Service Regulations. Service under this Rate Schedule is contingent upon the installation by the Company of telemetering equipment that reports daily consumption. N

CHARACTER OF SERVICE

The nature of Service provided by Company to Customer under this Rate Schedule is interruptible transportation service. N

Once a qualified Customer elects service under this Rate Schedule, all services will be provided under the terms and conditions of this Rate Schedule for a term extending through the following May 31. Upon meeting the qualifications contained therein, a Customer may receive service under Rate Schedule 309 concurrent with service provided under this Rate Schedule. Subject to the requirements set forth above, a Customer may, subject to the consent of the Company, elect to discontinue service under this Rate Schedule and receive service under Rate Schedule 304 and/or 310 by giving written notice to the Company prior to April 1 of any year. The Company will not withhold such consent provided (a) the Company continues to offer Interruptible General Sales Service under Rate Schedule 304, (b) the Company is able to provide Service under Rate Schedule 304 under commercially reasonable terms and conditions, and (c) the analyses applicable to reclassifications or changes in Service set forth in the Company's Service Regulations support such consent. If timely notice is received from Customer and consent is provided by Company, the Customer shall discontinue service under this Rate Schedule and Company shall provide Service under Rate Schedule 304/310, as applicable, effective the first June 1 following the notice. N

All gas delivered to pursuant to this Rate Schedule shall be metered by the Company separately from any gas delivered to Customer under any of the Company's other Rate Schedules. N

The Company will redeliver gas received by Company from upstream pipeline(s) for the Customer's account under this Rate Schedule in accordance with the Customer's scheduled and confirmed nominations and subject to the Company's Operating Conditions. N

Customers receiving services under this Rate Schedule shall maintain, in useable condition, alternate-fuel facilities with ample on-site alternate fuel capability for supplying 100% of the establishment's gas requirements during periods of gas interruption or curtailment. Such interruption or curtailment shall be immediately effective upon verbal or written notification by the Company, and Customer shall refrain from using gas until permitted to do so by the Company. It is understood and agreed that the Company will have the right to suspend gas service without further notice to the Customer in the event Customer fails to curtail Customer's use of gas in accordance with the Company's notice of curtailment.

APPLICABILITY
Transportation service is available under this Rate Schedule to any qualified Customer connected to the Company's system who has obtained an independent supply of natural gas and has arranged to have this supply delivered to one of the Company's existing delivery points for transportation by the Company to the Customer's facilities.

The Company will deliver **ON AN INTERRUPTIBLE BASIS** gas previously transported by a connected pipeline for the Customer's account under this Rate Schedule on a day-to-day basis in accordance with the Customer's scheduled and confirmed nominations. The Company reserves the right to suspend service on any day when, in the Company's sole opinion, its operating conditions are such that suspension of service is necessary. The Company reserves the right to limit, allocate, or direct third party gas nominations among the interstate pipelines serving the Company's distribution system, when, in the Company's sole opinion, such action is necessary to maintain the operational integrity of the system. D

MARGIN RATE

Monthly Charge	$800.00
Commodity Charge (per therm)	
1st Step (0-15,000 therms)	$.09682
2nd Step (15,001-40,000 therms)	$.08953
3rd Step (40,001-90,000 therms)	$.06450
4th Step (Over 90,000 therms)	$.02764

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MONTHLY MINIMUM BILL
The minimum monthly bill shall be the Monthly Charge. T

MONTHLY CHARGE
A charge will be billed monthly to all Customers for the availability of gas service. This charge will be in addition to the Commodity Charge. The Monthly Charge will be billed from the date of initial service until service is terminated at the Customer's request. N

COMMODITY CHARGE
The rate per therm shall be billed on the quantity of gas delivered by Company to Customer's premises. N

SERVICE AGREEMENTS
All Customers receiving service pursuant to this Rate Schedule shall be required to execute the Company's standard contracts and/or service applications and shall be subject to the Company's Rules and Regulations as filed with and approved by the Tennessee Regulatory Authority (TRA).

PAYMENT TERMS
All bills for service are due upon presentation and the net rates are applicable if payment is made on or before the last date of payment stated on the bill. Payments made after that date shall be for the gross amount which is greater by five percent (5%) than the net billing.

RETURNED CHECK CHARGE
In the event a Customer's check for payment is returned to the Company marked NSF (Non Sufficient Funds) the Customer will be assessed a charge of $20.00.

EFFECTIVE: March 1, 2012

ADJUSTMENTS

Bills for transportation service are subject to adjustment caused by changes in the cost of purchased gas in accordance with Rule No. 1220-4-1-.12 of the TRA Rules and Regulations.

Purchase gas adjustments and all applicable taxes and fees are in addition to the above stated margin rates in accordance with the Rules, Regulations and Orders of the TRA and the Laws of the State of Tennessee.

SERVICE AVAILABILITY

All requests for new or additional service or the transfer of existing service to a higher priority end use will be considered based upon the Company's judgment as to the available gas supply, Customer's load factor or use pattern, end use, impact on the local economy, Company's Service Regulations, the TRA Rules and Regulations, the Orders of the TRA, and the Laws of the State of Tennessee. N

SERVICE INTERRUPTION AND CURTAILMENT

Gas service under this schedule is interruptible and is subject to the provisions contained within TRA Schedule No. 306, "Schedule for Limiting and Curtailing Service" and Company's Service Regulations. S

BALANCING, CASH-OUT, AND AGENCY AUTHORIZATION

Service under this Rate Schedule shall be subject to all of the provisions and requirements of Rate Schedule 307, "Balancing, Cash-Out, and Agency Authorization." N

APPLICABLE DOCUMENTS DEFINING OBLIGATIONS OF THE COMPANY AND ITS CUSTOMERS

The applicable documents defining the obligations of the Company and its Customers are those described in Section 1 of the Company's Service Regulations. N

EFFECTIVE: March 1, 2012

SERVICE SCHEDULE NO. 315
Weather Normalization Adjustment (WNA) Rider

I. Provision for Adjustment

The base rates per therm (100,000 Btu) for gas service set forth in any rate schedules utilized by the Authority in determining normalized test period revenues shall be adjusted by an amount hereinafter described, which amount is referred to as the "Weather Normalization Adjustment".

The Weather Normalization Adjustment will be applicable for bills rendered on and after October 1 and continuing through the final billing cycle in April of each year. C

II. Definitions

For the purposes of this Rider:

"Authority" means the Tennessee Regulatory Authority.

"Relevant Rate Order" means the final order of the Authority in the most recent litigated rate case of the Company fixing the rates of the Company or the most recent final order of the Authority specifically prescribing or fixing the factors and procedures to be used in the application of this Rider.

III. Computation of Weather Normalization Adjustment

The Weather Normalization Adjustment shall be computed to the nearest one-hundredth cent per therm by the following formula:

$$WNA_i = R_i * \frac{(HSF_i(NDD-ADD))}{(BL_i + (HSF_i \times ADD))}$$

Where:

$I =$ any particular rate schedule or billing classification within any particular rate schedule that contains more than one billing classification.

$WNA_i =$ Weather Normalization Adjustment Factor for the i^{th} rate schedule or classification expressed in cents per therm.

$R_i =$ weighted average base rate (base rate less any embedded gas cost) of temperature sensitive sales for the i^{th} schedule or classification utilized by the Authority in the Relevant Rate Order for the purpose of determining normalized test year revenues.

EFFECTIVE: March 1, 2012

HSF_i = heat sensitive factor for the i^{th} schedule or classification utilized by the Authority in the Relevant Rate Order for the purpose of determining normalized test year revenues.

NDD = normal billing cycle heating degree days utilized by the Authority in the Relevant Rate Order for the purpose of determining normalized test year revenues.

ADD = actual billing cycle heating degree days.

BL_i = base load sales for the i^{th} schedule or classification utilized by the Authority in the Relevant Rate Order for the purpose of determining normalized test year revenues.

IV. Filing with Authority

The Company will file as directed by the Authority (a) a copy of each computation of the Weather Normalization Adjustment, (b) a schedule showing the effective date of each such Weather Normalization Adjustment, and a schedule showing the factors or values derived from the Relevant Rate Order used in calculating such Weather Normalization Adjustment.

SERVICE SCHEDULE NO. 316
Performance Incentive Plan

Applicability

The Performance Incentive Plan (the Plan) replaces the annual reasonableness or prudence review of the Company's gas purchasing activities overseen by the Tennessee Regulatory Authority (Authority or TRA). The Plan does not preclude the Authority from conducting an independent investigation into or examination of any aspect of the Plan or the Company's conduct thereunder. The Plan is designed to provide incentives to the Company in a manner that will produce rewards for its customers and its stockholders and improvements in the Company's gas procurement and capacity management activities. Each plan year (Plan Year) will begin July 1st. The annual provisions and filings herein would apply to this annual period. The Plan will continue until the Plan is either (a) terminated at the end of a Plan Year by not less than 90 days notice by the Company to the Authority or (b) the Plan is modified, amended or terminated by the Authority on a prospective basis.

Overview of Structure

The Plan establishes a predefined benchmark index to which the Company's commodity cost of gas is compared. It also addresses the recovery of gas supply reservation fees and the treatment of off-system sales and wholesale interstate sale for resale transactions. The net incentive benefits or costs will be shared between the Company's customers and the Company on a 75%-customers / 25%- stockholders basis for the Plan Year commencing on July 1, 2006.

The Plan also is designed to encourage the Company to actively market off-peak unutilized transportation and storage capacity on pipelines in the secondary market. It also addresses the sharing of asset management fees paid by asset managers, and other forms of compensation received by the Company for the release and/or utilization of the Company's transportation and storage assets by third-parties. The Company shall notify the TRA Staff and the Consumer Advocate and Protection Division of the Office of the Attorney General (CAD) of all "other forms of compensation" prior to inclusion of such compensation in the Plan. The net incentive benefits or costs of such activities will be shared between the Company's customers and the Company utilizing a 75%-customers / 25%-stockholders formula commencing on July 1, 2006.

Every three years the Company's activities under the Plan will be reviewed comprehensively by an independent consultant. The first triennial review shall occur in the autumn of 2008. The scope of the review may include all transactions and activities related to the Performance Incentive Plan, including, but not limited to, natural gas procurement, capacity management, storage, hedging, reserve margins, and off-system sales.

The Company is subject to a cap on overall incentive gains or losses of $1.6 million annually. In connection with the Performance Incentive Plan, the Company shall file with the Authority Staff,

and supply a copy to the Consumer Advocate and Protection Division of the Tennessee Attorney General (CAD), and update each year, a Three Year Supply Plan. The Company will negotiate/obtain firm capacity, interruptible capacity and/or gas supply pursuant to such plan. C

Commodity Costs

Each month the Company will compare its *total city gate commodity and cost of gas*[1] to a benchmark dollar amount. The benchmark gas cost will be computed by multiplying total actual purchase quantities for the month by a price index. The monthly price index is defined as:

$$I = F_f(P_0K_0+P_1K_1+P_cK_c+...P_\alpha K_\alpha) +F_0O+F_dD; \text{ where}$$
$$F_f+F_0+F_d=1; \text{ and}$$

I = the monthly city gate commodity gas cost index.

F_f = the fraction of gas supplies purchased in the first-of-the-month market which are transported to the city gate under the Company's FT, negotiated FT, and IT service agreements. C

P = the Inside FERC Gas Market Report price index for the first-of-the-month edition for a geographic pricing region, where subscript 0 denotes Tennessee Gas Pipeline (TGP) Rate Zone 0; subscript 1 denotes TGP Rate Zone 1; subscript C denotes Columbia Gulf Transmission (CGT) - mainline, and subscript α denotes new incremental firm services to which the Company may subscribe in the future.[2] The indices used for calculating Midwestern capacity shall be those produced by Natural Gas Intelligence for monthly purchases and Gas Daily for daily purchases. The commodity index prices will be adjusted to include the appropriate pipeline firm transportation (FT) and interruptible transportation (IT) commodity transportation charges and fuel retention to the city gate under the Company's FT, negotiated FT, and IT service agreements.[3] C

[1] Gas purchases associated with service provided under Texas Eastern Transmission Company Rate Schedule SCT shall be excluded from the incentive mechanism. The Company will continue to recover 100 percent of these costs through its PGA with no profit or loss potential. Extension or replacement of such contract shall be subject to the same competitive bidding procedures that will apply to other firm gas supply agreements. In addition, the Plan will measure storage gas supplies against the benchmark index during the months such quantities are purchased for injection. For purposes of comparing such gas purchase costs against the monthly city gate index price, the Company will exclude any commodity costs incurred downstream of the city gate to storage so that the Company's actual costs and the benchmark index are calculated on the same basis.

[2] To the extent that the Company renegotiates existing reservation fee supply contracts or executes new reservation fee supply contracts with commodity pricing provisions at a discount to the first-of-the-month price index, the Company shall modify the monthly commodity price index to reflect such discount.

[3] Capacity released for a month shall be excluded from the benchmark calculation for that month, excluding capacity released under an agreement where the Company maintains city gate delivery rights for the released capacity during such month.

K = the fraction (relative to total maximum daily contract entitlement) of the Company's total firm, negotiated firm, and interruptible transportation capacity under contract in a geographic pricing region, where the subscripts are as above.[4] C

F_o = the fraction of gas supplies purchased in the first-of-the-month spot market which are delivered to the Company's system using transportation arrangements other than the Company's FT, negotiated FT, and IT contracts. C

0 = the weighted average of Inside FERC Gas Market Report first-of-the-month price indices, plus applicable IT rates and fuel retention, from the source of the gas to the city gate, where the weights are computed based on actual purchases of gas supplies purchased by the Company and delivered to the Company's system using transportation arrangements other than the Company's FT, negotiated FT, and IT contracts. C

F_d = the fraction of gas supplies purchased in the daily spot market.

D = the weighted average of daily average index commodity prices taken from Gas Daily for the appropriate geographic pricing regions, where the weights are computed based on actual purchases made during the month. The commodity index prices will be adjusted to include the appropriate transportation commodity charges and fuel retention to the city gate.

Gas Supply Reservation Fees

The Company will continue to recover 100% of gas supply reservation fee costs through its PGA with no profit or loss potential. For new contracts and/or contracts subject to renegotiation during the Plan Year, the Company will solicit bids for gas supply contracts containing a reservation fee.

Off-System Sales And Sale For Resale Transactions

Margin on off-system sales and wholesale sale-for-resale transactions using the Company's firm, negotiated firm, and interruptible transportation and capacity entitlements (the costs of which are recovered from the Company's ratepayers) shall be credited to the Plan and will be shared with ratepayers. Margin on such sales will be defined as the difference between the sales proceeds and the total variable costs incurred by the Company in connection with the transaction, including transportation and gas costs, taxes, fuel, or other costs. For purposes of gas costs, the Company will impute such costs for its related C
supply purchases at the benchmark first-of-the-month or daily index, as appropriate, on the pipeline and in the zone in which the sale takes place. The difference between the Company's

[4] Because the aggregate maximum daily contract quantities in the Company's FT contract portfolio vary by month over the course of the year, the weights will be recalculated each month to reflect actual contract demand quantities for such month. The contract weights, and potentially the price indices used, will also vary as the Company renegotiates existing or adds new FT contracts. As new contracts are negotiated, the Company shall modify the index to reflect actual contract demand quantities and the commodity price indices appropriate for the supply regions reached by such FT agreements. Citygate benchmark calculations shall be computed utilizing the Company's Design Day delivery requirements (deliveries required on a peak day).

actual costs and such index price is taken into account under the Plan. After deducting the total transaction costs from the sales proceeds, any remaining margin will be credited to commodity gas costs and shared with customers on a 75%- customer / 25%-stockholders basis.

Capacity Management

To the extent the Company is able to release transportation or storage capacity, or generate transportation or storage margin associated with off-system or wholesale sales-for-resale, the associated cost savings and/or asset management fees, or other forms of compensation associated with such activities, shall be shared by the Company and customers according to the following sharing formula: 75%-customers / 25%-stockholders. The Company shall notify the TRA Staff and the Consumer Advocate and Protection Division of the Office of the Attorney General (CAD) of all "other forms of compensation" prior to inclusion of such compensation in the Plan.

Hedging Activities

The Company may engage in hedging transactions[5] within the PGA/ACA mechanism. Costs related to hedging transactions may be recovered through the ACA account; provided, however, that such costs recovered through the ACA account shall not exceed one percent (1%) of total annual gas costs.[6] Costs related to hedging transactions recoverable through the ACA account shall be defined as all direct, transaction related costs arising from the Company's prudent efforts to stabilize or hedge its commodity gas costs including, without limitation, brokerage fees, and the costs of financial instruments.

All costs related to hedging transactions, in addition to all gains and losses from hedging transactions, shall be credited/debited to the ACA account in the respective month that each hedging transaction closes. Costs related to hedging transactions that are incurred prior to the month that the hedging transaction closes shall be temporarily recorded in a separate, non-interest bearing account for tracking purposes.

Determination of Shared Saving

Each month during the term of the Plan, the Company will compute any gains or losses in accordance with the Plan. If the Company earns a gain, a separate Incentive Plan Account (IPA) will be debited with such gain. If the Company incurs a loss, that same IPA will be credited with such loss. During a Plan Year, the Company will be limited to overall gains or losses totaling $1.6 million. Interest shall be computed on balances in the IPA using the same interest rate and methods as used in the Company's Actual Cost Adjustment (ACA) account. The offsetting entries to IPA gains or losses will be recorded to income or expense, as appropriate. At its option, however, the Company may temporarily record any monthly gains in a non-regulatory deferred credit balance sheet account until results for the entire Plan Year are available.

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[5] Hedging transactions, as used herein, shall include but not be limited to futures contracts, financial derivative products, storage swap arrangements, or other private agreements to hedge, manage or reduce gas costs.

[6] One percent (1%) of total annual gas costs, for the purposes of establishing a recovery cap, shall be computed from the most current audited and approved gas costs for the Company in a TRA docket as of the first day of the month, 12 months prior to the first day of the period under audit.

Gains or losses accruing to the Company under the Plan will form the basis for a rate increment or decrement to be filed and placed into effect separate from any other rate adjustments to recover or refund such amount over a prospective twelve-month period. The Company is subject to a cap on overall incentive gains or losses of $1.6 million annually.

Each year, effective November 1, the rates for all customers, excluding transportation customers who receive no direct benefit from any gas cost reductions resulting from the Plan, will be increased or decreased by a separate rate increment or decrement designed to amortize the collection or refund of the June 30 IPA balance over the succeeding twelve month period. The increment or decrement will be established by dividing the June 30 IPA balance by the appropriate volumetric billing determinants for the twelve months ended June 30. During the twelve month amortization period, the amount collected or refunded each month will be computed by multiplying the billed volumetric determinants for such month by the increment or decrement, as applicable. The product will be credited or debited to the IPA, as appropriate. The balance in the IPA will be tracked as a separate collection mechanism. Subject to approval by the TRA, the Company may also propose to refund positive IPA balances on an intra-year basis by making direct bill credits to all customers (except transportation customers) where such direct bill credit would be beneficial to customers.

Filing with the Authority

The Company will file calculations of shared savings and shared costs quarterly with the Authority not later than 60 days after the end of each interim fiscal quarter and will file an annual report not later than 60 days following the end of each Plan Year. Unless the Authority provides written notification to the Company within 180 days of the annual reports, the Incentive Plan Account shall be deemed in compliance with the provisions of this Service Schedule. The Authority Staff may expand the time for consideration of the annual reports by up to an additional sixty (60) days upon written notification to the Company or longer by mutual agreement or upon a showing of good cause.

Periodic Index Revisions

Because of changes in the natural gas marketplace, the price indices utilized by the Company, and the composition of the Company's purchased gas portfolio may change. The Company shall, within sixty (60) days of identifying a change to a significant component of the mechanism, provide notice of such change to the Authority. Unless the Authority provides written justification to the Company within sixty (60) days of such notice, the price indices shall be deemed approved as proposed by the Company.

Gas Supply Incentive Compensation Program

The Company has in place a Gas Supply Incentive Compensation Program (the Program) designed to provide incentive compensation to selected Gas Supply non-executive employees involved in the implementation of the Company's Incentive Plan and Secondary Marketing Programs in a manner consistent with the benefits achieved for customers and shareholders through improvements in gas procurement and secondary marketing activities. Participants in

the program receive incentive compensation as recognition for their contribution to the customers and shareholders of the Company through lower gas costs and gains related thereto. Performance measures are established for the Program each year.

During the time this tariff is in effect, the Company will continue to have in place the Gas Supply Incentive Compensation Program, as detailed to the Authority, as it relates to the Company's Incentive Plan. The Company will advise the Authority in writing of any changes to the Program, and unless the Company is advised within 60 days, said changes will become effective. The Authority may expand the time for consideration of such changes upon written notification to the Company. No filing for prior approval is required for changes in the performance measures.

Triennial Review

A comprehensive review of the transactions and activities related to the Performance Incentive Plan shall be conducted by an independent consultant once every three years. The initial triennial review shall be conducted in the autumn of 2008 and subsequent triennial reviews shall be conducted every third year thereafter. The TRA Staff, the CAD, and the Company shall make an effort to maintain a list of no less than five (5) mutually agreeable independent consultants or consulting firms qualified to conduct the aforementioned review. Any dispute concerning whether an independent consultant shall be added to the list shall be resolved by the TRA Staff, after consultation with the Company and the CAD. For each review, the TRA Staff shall select three (3) prospective independent consultants from that list. Each such consultant shall possess the expertise necessary to conduct the review. The TRA Staff shall provide the list of prospective independent consultants to the Company and the CAD via e-mail. The Company and the CAD shall have the right, but not the obligation, to strike one (1) of the prospective independent consultants from the list by identifying the stricken consultant in writing to the TRA Staff within thirty (30) days from the date the list is e-mailed. The TRA Staff shall select the independent consultant from those remaining on the list after the Company's and the CAD's rights to strike have expired. The cost of the review shall be reasonable in relation to its scope. Any and all relationships between the independent consultant and the Company, the TRA Staff, and/or the CAD shall be disclosed, and the independent consultant shall have had no prior relationship with either the Company, the TRA Staff, or the CAD for at least the preceding five (5) years unless the Company, the TRA Staff and the CAD agree in writing to waive this requirement. The TRA Staff, the CAD and the Company may consult amongst themselves during the selection process; provided, however, that all such communications between the parties shall be disclosed to any party not involved in such communication so that each party may participate fully in the selection process.

The scope of the triennial reviews may include all transactions and activities related either directly or indirectly to the Performance Incentive Plan as conducted by the Company or its affiliates, including, but not limited to, the following areas of transactions and activities: (a) natural gas procurement; (b) capacity management; (c) storage; (d) hedging; (e) reserve margins; and (f) off-system sales. The scope of each triennial review shall include a review of each of the foregoing matters as well as such additional matters as may be reasonably identified by the

Company, the TRA Staff, or the CAD relative to the operation or results of the Performance Incentive Plan.

The Company, the TRA Staff, or the CAD may present documents and information to the independent consultant for the independent consultant's review and consideration. Copies of all such documents and information shall be presented simultaneously to the independent consultant and all other parties.

The independent consultant shall make findings of fact, as well as identify and describe areas of concern and improvement, if any, that in the consultant's opinion warrant further consideration; however, the independent consultant shall not propose changes to the structure of the Performance Incentive Plan itself. The independent consultant shall complete and issue a written report of its findings and conclusions by July 1 of the year immediately following the triennial review. The report deadline may be waived by the written consent of the TRA Staff, the Company, and the CAD.

The independent consultant shall not propose changes to the structure of the Performance Incentive Plan itself; however, the TRA Staff, the Company, or the CAD may use the report of the independent consultant as grounds for making recommendations or proposed changes to the Authority, and the TRA Staff, the Company, or the CAD may support or oppose such recommendations or proposed changes. Any proposed changes to the structure of the Performance Incentive Plan resulting from the initial triennial review or subsequent triennial reviews, whether adopted by agreement or pursuant to a ruling of the Authority, shall be implemented on a prospective basis only beginning with the incentive Plan Year immediately following such agreement or ruling.

The cost of the triennial reviews shall be paid initially by the Company and recovered through the ACA account. The TRA Staff may continue its annual audits of the IPA and the ACA account, and the triennial reviews shall not in any way limit the scope of such annual audits. The CAD retains all of its statutory rights, and the triennial reviews shall not in any way affect such rights.

RATE SCHEDULE NO. 321
Residential Service-Standard Rate

AVAILABILITY

Gas service under this Rate Schedule is available in the area served by the Company in the State of Tennessee to any full requirements single private residences, including the separate private units of apartment houses and other multiple dwellings, actually used for residential purposes, which are separately metered where the Company's distribution mains are suitable for supplying the desired service.

Rate Schedule 321 applies to all residential customers whose base load usage in both of the cycle billing months of July and August is less than 15 therms. Base load usage will be based upon Customer's usage in the Company's most recent residential base load period adjusted for cycle length. Availability of this Rate Schedule for new Customers will be based on reasonably anticipated base load usage. Reclassification of customers between rate schedules will be based upon procedures set forth in the Company's Service Regulations as approved by the Tennessee Regulatory Authority.

MARGIN RATE	Winter (November-March)	Summer (April-October)
Customer Charge (per month)	$13.00	$10.00
Commodity Charge (per therm)	$.32000	$.27000

D

MONTHLY CUSTOMER CHARGE

A charge will be billed monthly to all Customers for the availability of gas service. This charge will be in addition to the commodity charge for gas delivered. The Customer charge will be billed from the date of initial service until service is terminated at the Customer's request

BACKUP SERVICE

When gas service is being supplied for use as a Backup Service for the dual-fuel heat pump or for similar use where the Customer's equipment is specifically designed by the manufacturer or is modified by the Customer or others for the purpose of using natural gas as the equipment's backup energy source, there shall be payable monthly in addition to all and other charges under this Rate Schedule a Backup Service Demand Charge individually determined for each Customer based upon the Customer's applicable gas equipment input rating. The per therm Demand Charge shall be equal to the unit Demand Charge applicable to the Company's firm industrial rate schedules.

EFFECTIVE: November 1, 2008

Input shall be based upon individual Customer's applicable gas equipment rating in:

$$\frac{\text{BTU/Hour x 10 hours}}{\text{100,000 BTU}} = \text{TH}$$

SERVICE AGREEMENTS
All Customers purchasing gas pursuant to this schedule shall be subject to the Company's standard contracts and/or service applications and subject to the Company's Service Regulations as filed with the TRA.

PAYMENT TERMS
All bills for service are due upon presentation and the net rates are applicable if payment is made on or before the last date of payment stated on the bill. Payments made after that date shall be for the gross amount which is greater by five percent (5%) than the net billing.

RETURNED CHECK CHARGE
In the event a Customer's check for payment is returned to the Company marked NSF (Non Sufficient Funds) the Customer will be assessed a charge of $20.00.

D

ADJUSTMENTS
Bills for service are subject to adjustment caused by changes in the cost of purchased gas in accordance with Rule No. 1220-4-1-.12 of the TRA Rules and Regulations.

Purchased gas adjustments and all applicable taxes and fees are in addition to the above stated margin rates in accordance with The Rules, Regulations and Orders of the TRA and Laws of the State of Tennessee.

SERVICE AVAILABILITY
All requests for new and additional service or the transfer of existing service to higher priority end use will be considered based upon the Company's judgement as to the available gas supply, Customer's load factor or use pattern, end use, impact on the local economy, and The Rules, Regulations, and Orders of the TRA and Laws of the State of Tennessee.

SERVICE INTERRUPTION AND CURTAILMENT
Gas service under this schedule is subject to the provisions contained within TRA Schedule No. 306, "Schedule for Limiting and Curtailing Service".

WEATHER NORMALIZATION ADJUSTMENT
Gas service under this schedule is subject to the provisions contained within TRA Schedule No. 315, "Weather Normalization Adjustment Rider".

EFFECTIVE: November 1, 2008

RATE SCHEDULE NO. 332
Small General Service – Value Rate

AVAILABILITY

Gas service under this Rate Schedule is available in the area served by the Company in the State of Tennessee to any full requirements non-residential Customer whose average daily usage is less than 20 dekatherms per day and whose Summer Load Percentage (SLP) is greater than 30%. Average daily gas usage will be based on the Customer's usage during the most recent calendar year ended on December 31 and adjusted for cycle length. SLP will be determined based upon the percentage of the Customer's total annual usage represented by the Customer's seven (7) month summer usage (April – October). Availability of this Rate Schedule for new Customers or for Customers without at least one full year of usage history will be based on reasonably anticipated usage.

Reclassification of customers between rate schedules will be based upon procedures set forth in the Company's Service Regulations as approved by the Tennessee Regulatory Authority.

MARGIN RATE	Winter (November-March)	Summer (April-October)
Customer Charge (per month)	$29.00	$29.00
Commodity Charge (per therm)		
1st 2,000 therms	$.35400	$.30300
Over 2,000 therms	$.35400	$.30300

D

MONTHLY CUSTOMER CHARGE

A charge will be billed monthly to all Customers for the availability of gas service. This charge will be in addition to the commodity charge for gas delivered. The Customer charge will be billed from the date of initial service until service is terminated at the Customer's request.

BACKUP RATE

When gas service is being supplied for use as a Backup Service for the dual-fuel heat pump or for similar use where the Customer's equipment is specifically designed by the manufacturer or is modified by the Customer or others for the purpose of using natural gas as the equipment's backup energy source, there shall be payable monthly in addition to all and other charges under this Rate Schedule a Backup Service Demand Charge individually determined for each Customer based upon the Customer's applicable gas equipment input rating. . The per therm Demand Charge shall be equal to the unit Demand Charge applicable to the Company's firm industrial rate schedules.

EFFECTIVE: November 1, 2008

Input shall be based upon individual Customer's applicable gas equipment rating in:

$$\frac{\text{BTU/Hour x 10 hours}}{\text{100,000 BTU}} = \text{TH}$$

SERVICE AGREEMENTS
All Customers purchasing gas pursuant to this schedule shall be subject to the Company's standard
contracts and/or service applications and subject to the Company's Rules and Regulations as filed with the TRA.

PAYMENT TERMS
All bills for service are due upon presentation and the net rates are applicable if payment is made on or before the last date of payment stated on the bill. Payments made after that date shall be for the gross amount which is greater by five percent (5%) than the net billing.

RETURNED CHECK CHARGE
In the event a Customer's check for payment is returned to the Company marked NSF (Non Sufficient Funds) the Customer will be assessed a charge of $20.00.

ADJUSTMENTS
Bills for service are subject to adjustment caused by changes in the cost of purchased gas in accordance with Rule No. 1220-4-1-.12 of the TRA Rules and Regulations.

Purchased gas adjustments and all applicable taxes and fees are in addition to the above stated margin rates in accordance with The Rules, Regulations and Orders of the TRA and Laws of the State of Tennessee.

SERVICE AVAILABILITY
All requests for new and additional service or the transfer of existing service to higher priority end use will be considered based upon the Company's judgement as to the available gas supply, Customer's load factor or use pattern, end use, impact on the local economy, and The Rules, Regulations, and Orders of the TRA and Laws of the State of Tennessee.

SERVICE INTERRUPTION AND CURTAILMENT
Gas service under this schedule is subject to the provisions contained within TRA Schedule No.306, "Schedule for Limiting and Curtailing Service".

WEATHER NORMALIZATION ADJUSTMENT
Gas service under this schedule is subject to the provisions contained within TRA Schedule No. 315, "Weather Normalization Adjustment Rider".

D

RATE SCHEDULE NO. 342
Natural Gas Vehicle Fuel

APPLICABILITY AND CHARACTER OF SERVICE

Gas Service under this Rate Schedule is available to any Customer in the area served by the Company in the State of Tennessee for the consumption of natural gas as a motor fuel, upon application to and consent by the Company to such Service, as provided in the Company's Service Regulations.

Gas Service under this Rate Schedule shall be metered at the Customer's Premises, or at the Company's Premises for purposes of providing public access to compressed natural gas filling stations. All gas delivered pursuant to this Rate Schedule shall be metered separately from any gas delivered under any of the Company's other Rate Schedules.

CHARACTER OF SERVICE

The nature of Service provided by Company to Customer under this Rate Schedule is firm sales Service.

N

MARGIN RATE	Winter (November-March)	Summer (April-October)
Monthly Charge	$40.00	$40.00
Rate/therm	$.23109	$.23109
Rate/GGE	$.29117	$.29117

HIGHWAY USE TAXES

The rates to be charged for gas Service pursuant to this Rate Schedule do not include applicable Federal, State and/or local highway motor fuel use taxes and fees. If applicable, bills rendered under this Rate Schedule will include such taxes and fees.

SERVICE AGREEMENTS

All Customers purchasing gas pursuant to this schedule shall be subject to the Company's standard contracts and/or service applications and subject to the Company's Service Regulations as filed with the TRA.

PAYMENT TERMS

All bills for service are due upon presentation and the net rates are applicable if payment is made on or before the last date of payment stated on the bill. Payments made after that date shall be for the gross amount which is greater by five percent (5%) than the net billing.

EFFECTIVE: March 1, 2012

RETURNED CHECK CHARGE
In the event a Customer's check for payment is returned to the Company marked NSF (Non Sufficient Funds) the Customer will be assessed a charge of $20.00.

ADJUSTMENTS
Bills for service are subject to adjustment caused by changes in the cost of purchased gas in accordance with Rule No. 1220-4-1-.12 of the TRA Rules and Regulations and the operation of Rate Schedule 316.

Purchased gas adjustments and all applicable taxes and fees are in addition to the above stated margin rates in accordance with The Rules, Regulations and Orders of the TRA and Laws of the State of Tennessee.

SERVICE AVAILABILITY
All requests for new and additional service or the transfer of existing service to higher priority end use will be supplied based upon the Company's judgment as to the available gas supply, Customer's load factor or use pattern, end use priority as specified by the Federal Energy Regulatory Commission (FERC), impact on the local economy, Company's Service Regulations, and The Rules, Regulations, and Orders of the TRA and Laws of the State of Tennessee.

SERVICE INTERRUPTION AND CURTAILMENT
Gas Service under this Rate Schedule is subject to the provisions contained within Rate Schedule 306, "Schedule for Limiting and Curtailing Service" and the Company's Service Regulations.

APPLICABLE DOCUMENTS DEFINING OBLIGATIONS OF THE COMPANY AND ITS CUSTOMERS
The applicable documents defining the obligations of the Company and its Customers are those described in Section 1 of the Company's Service Regulations.

RIDER
Service to Customers under this Rate Schedule using Company owned and maintained compressor facilities shall be billed at a maximum rate of $0.50 per therm, in addition to the base rate for Service under this Rate Schedule 342 as set forth above.

N

RATE SCHEDULE NO. 352
Medium General Service

AVAILABILITY

Gas service under this Rate Schedule is available in the area served by the Company in the State of Tennessee to any full requirements non-residential Customer, upon application to and consent by the Company to such Service, as provided in the Company's Service Regulations, whose average daily usage is equal to or greater than 20 dekatherms per day but less than 50 dekatherms per day Average daily gas usage will be based on the Customer's usage during the most recent calendar year ended on December 31 and adjusted for cycle length. Availability of this Rate Schedule for new Customers or for Customers without at least one full year of usage history will be based on reasonably anticipated usage. N

CHARACTER OF SERVICE

The nature of Service provided by Company to Customer under this Rate Schedule is firm sales Service. Any reclassification or change in quantity or character of Service to Customer will be subject to procedures set forth in the Company's Service Regulations. N

MARGIN RATE	Winter (November-March)	Summer (April-October)	
Monthly Charge	$225.00	$225.00	I
Commodity Charge (per therm)	$.35400	$.30000	R

MONTHLY CHARGE

A charge will be billed monthly to all Customers for the availability of gas service. This charge will be in addition to the Commodity Charge for gas delivered. The Monthly Charge will be billed from the date of initial service until service is terminated at the Customer's request. N

COMMODITY CHARGE

The rate per therm shall be billed on the quantity of gas delivered by Company to Customer's premises. N

BACKUP SERVICE

When gas service is being supplied for use as a Backup Service for the dual-fuel heat pump or for similar use where the Customer's equipment is specifically designed by the manufacturer or is modified by the Customer or others for the purpose of using natural gas as the equipment's backup energy source, there shall be payable monthly in addition to all and other charges under this Rate Schedule a Backup Service Demand Charge individually determined for each Customer based upon the Customer's applicable gas equipment input rating. The per therm Demand Charge shall be equal to the unit Demand Charge applicable to the Company's firm industrial rate schedules.

Input shall be based upon individual Customer's applicable gas equipment rating in:

EFFECTIVE: March 1, 2012

$$\frac{\text{BTU/Hour x 10 hours}}{\text{100,000 BTU}} = \text{TH}$$

SERVICE AGREEMENTS

All Customers purchasing gas pursuant to this schedule shall be subject to the Company's standard contracts and/or service applications and subject to the Company's Rules and Regulations as filed with the TRA.

PAYMENT TERMS

All bills for service are due upon presentation and the net rates are applicable if payment is made on or before the last date of payment stated on the bill. Payments made after that date shall be for the gross amount which is greater by five percent (5%) than the net billing.

RETURNED CHECK CHARGE

In the event a Customer's check for payment is returned to the Company marked NSF (Non Sufficient Funds) the Customer will be assessed a charge of $20.00.

ADJUSTMENTS

Bills for service are subject to adjustment caused by changes in the cost of purchased gas in accordance with Rule No. 1220-4-1-.12 of the TRA Rules and Regulations and the operation of Rate Schedule 316.

Purchased gas adjustments and all applicable taxes and fees are in addition to the above stated margin rates in accordance with The Rules, Regulations and Orders of the TRA and Laws of the State of Tennessee.

SERVICE AVAILABILITY

All requests for new and additional service or the transfer of existing service to higher priority end use will be considered based upon the Company's judgment as to the available gas supply, Customer's load factor or use pattern, end use, impact on the local economy, Company's Service Regulations, and The Rules, Regulations, and Orders of the TRA and Laws of the State of Tennessee. S

SERVICE INTERRUPTION AND CURTAILMENT

Gas service under this schedule is subject to the provisions contained within TRA Schedule No. 306, "Schedule for Limiting and Curtailing Service" and Company's Service Regulations. N

WEATHER NORMALIZATION ADJUSTMENT

Gas service under this schedule is subject to the provisions contained within TRA Schedule No. 315, "Weather Normalization Adjustment Rider".

APPLICABLE DOCUMENTS DEFINING OBLIGATIONS OF THE COMPANY AND ITS CUSTOMERS

The applicable documents defining the obligations of the Company and its Customers are those described in Section 1 of the Company's Service Regulations. N

EFFECTIVE: March 1, 2012

RATE SCHEDULE NO. 362
Medium General Service – Value Rate

AVAILABILITY

Gas service under this Rate Schedule is available in the area served by the Company in the State of Tennessee to any full requirements non-residential Customer whose average daily usage is equal to or greater than 20 dekatherms per day but less than 50 dekatherms per day and whose Summer Load Percentage (SLP) is greater than 30%. Average daily gas usage will be based on the Customer's usage during the most recent calendar year ended on December 31 and adjusted for cycle length. SLP will be determined based upon the percentage of the Customer's total annual usage represented by the Customer's seven (7) month summer usage (April – October). Availability of this Rate Schedule for new Customers or for Customers without at least one full year of usage history will be based on reasonably anticipated usage.

Reclassification of customers between rate schedules will be based upon procedures set forth in the Company's Service Regulations as approved by the Tennessee Regulatory Authority.

MARGIN RATE	Winter (November-March)	Summer (April-October)
Customer Charge (per month)	$75.00	$75.00
Commodity Charge (per therm)		
1st 5,000 therms	$.35400	$.30300
Over 5,000 therms	$.35400	$.30300

D

MONTHLY CUSTOMER CHARGE

A charge will be billed monthly to all Customers for the availability of gas service. This charge will be in addition to the commodity charge for gas delivered. The Customer charge will be billed from the date of initial service until service is terminated at the Customer's request.

BACKUP RATE

When gas service is being supplied for use as a Backup Service for the dual-fuel heat pump or for similar use where the Customer's equipment is specifically designed by the manufacturer or is modified by the Customer or others for the purpose of using natural gas as the equipment's backup energy source, there shall be payable monthly in addition to all and other charges under this Rate Schedule a Backup Service Demand Charge individually determined for each Customer based upon the Customer's applicable gas equipment input rating. The per therm Demand Charge shall be equal to the unit Demand Charge applicable to the Company's firm industrial rate schedules.

Input shall be based upon individual Customer's applicable gas equipment rating in:

$$\frac{\text{BTU/Hour}}{10 \text{ hours}} = \text{TH}$$

EFFECTIVE: November 1, 2008

100,000 BTU

SERVICE AGREEMENTS
All Customers purchasing gas pursuant to this schedule shall be subject to the Company's standard contracts and/or service applications and subject to the Company's Rules and Regulations as filed with the TRA.

PAYMENT TERMS
All bills for service are due upon presentation and the net rates are applicable if payment is made on or before the last date of payment stated on the bill. Payments made after that date shall be for the gross amount which is greater by five percent (5%) than the net billing.

RETURNED CHECK CHARGE
In the event a Customer's check for payment is returned to the Company marked NSF (Non Sufficient Funds) the Customer will be assessed a charge of $20.00.

ADJUSTMENTS
Bills for service are subject to adjustment caused by changes in the cost of purchased gas in accordance with Rule No. 1220-4-1-.12 of the TRA Rules and Regulations.

Purchased gas adjustments and all applicable taxes and fees are in addition to the above stated margin rates in accordance with The Rules, Regulations and Orders of the TRA and Laws of the State of Tennessee. D

SERVICE AVAILABILITY
All requests for new and additional service or the transfer of existing service to higher priority end use will be considered based upon the Company's judgement as to the available gas supply, Customer's load factor or use pattern, end use, impact on the local economy, and The Rules, Regulations, and Orders of the TRA and Laws of the State of Tennessee.

SERVICE INTERRUPTION AND CURTAILMENT
Gas service under this schedule is subject to the provisions contained within TRA Schedule No. 306, "Schedule for Limiting and Curtailing Service".

WEATHER NORMALIZATION ADJUSTMENT
Gas service under this schedule is subject to the provisions contained within TRA Schedule No. 315, "Weather Normalization Adjustment Rider".

EFFECTIVE: November 1, 2008

APPENDIX A

CUSTOMER AGENT AGREEMENT

This Customer Agent Agreement ("Agreement") is made this _____ day of _____, 20__, by and between Piedmont Natural Company, Inc. ("Piedmont") and _____ ("Agent").

WHEREAS, Piedmont's natural gas transportation tariffs provide for the ability of customers receiving Piedmont's transportation services to designate and utilize a third-party agent for purposes of making nominations for and delivering natural gas to Piedmont on behalf of such customers and managing imbalances on the Piedmont system resulting from such activities; and

WHEREAS, in undertaking such activities on behalf of Piedmont's customers, such Agents have the capacity to create material economic and operational risks for Piedmont and its customers; and

WHEREAS, Agent desires to act as a Customer Agent on Piedmont's system; and

WHEREAS, Piedmont is willing to permit Agent to operate on its system under the terms and conditions set forth herein and under the parameters of Piedmont's approved tariffs and service regulations.

NOW, THEREFORE, in consideration of the premises, and other good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, Piedmont and Agent agree as follows:

1. Establishment and Maintenance of Creditworthiness. Each Agent must establish credit with Piedmont in the form of a Letter of Credit, escrow deposit, parental guaranty, or otherwise, in form and substance acceptable to Piedmont, in an amount equal to or greater than the dollar value obtained by the following formula at all times:

> The higher of Agent's average daily load for the previous month or Agent's First-of-Month confirmed daily nomination quantity for the new month x 3 days x (NYMEX prompt month close) x 1.25.

Each month, prior to nominating transactions for the first of the month business, an evaluation will be made to ensure that the established credit does not fall below the value obtained from the formula shown above. In the event Agent's established credit falls below the value obtained through application of the formula shown above, either during this monthly evaluation or at any other time, Piedmont may require that the value of said Letter of Credit, escrow deposit, parental guaranty, or other form of assurance be changed at any time in order to reestablish adequate creditworthiness hereunder. In the event Agent fails to establish creditworthiness as set forth above, or fails to comply within 5 days with directions from Piedmont to increase the amount of its credit instruments as provided herein, then Agent's right to conduct business on the Piedmont system shall be suspended until such time as Agent shall be in compliance with the creditworthiness provisions set forth herein (including any requirements to increase said creditworthiness).

2. Customer Agent Imbalance Restrictions. Agent shall not create a cumulative intra-month imbalance which exceeds three times Agent's aggregate First-of-Month confirmed daily nomination quantity. If this cumulative month-to-date imbalance restriction is exceeded at any time, then Agent's authorization to conduct business on Piedmont's system shall be immediately suspended except to the extent of transactions designed to reduce Agent's cumulative month-to-date imbalance. Upon any such suspension, Agent's authorization to conduct business on the Piedmont system shall not be restored until such time as Agent is in full compliance with the provisions hereof and all applicable provisions of Piedmont's tariffs and service regulations.

3. Allocation of Imbalance Quantities/Penalties. Concurrent with the submission of monthly nominations, Agent shall provide Piedmont with a schedule of allocated nominations for customers to be served by Agent for the following month. This allocation shall serve as the basis for resolving imbalances with Agent's customers to the extent those imbalances are not resolved by Agent. In the event Agent fails to submit such schedule, and further fails to resolve any monthly imbalance during the term hereof, those imbalances and any attendant penalties shall be allocated to Agent's customers, *pro rata*, based upon the actual usage of each such customer during the month to which the unresolved imbalance and/or penalties is attributable.

4. Failure to Comply with Operational Notices, and Agent Creditworthiness and Imbalance Requirements. If Agent fails to adhere to the imbalance and credit requirements set forth above, or to obey specific instructions issued by Piedmont and designed to preserve the operational integrity of Piedmont's system, Agent (a) shall be subject to the Unauthorized Over Run Penalty provisions of Piedmont's Rate Schedule 306, and (b) shall have its right to transact business on Piedmont's system suspended.

5. Term. This Agreement shall become effective as of the date first written above and shall continue in full force or effect until terminated by either party hereto upon sixty (60) days written notice.

6. Supplemental Nature of Agreement. This Agreement is supplemental to the provisions of Piedmont's approved tariffs and service regulations, the provisions of which shall also apply to services rendered hereunder. As such, the restrictions and requirements set forth herein are cumulative in nature and in addition to any other imbalance or penalty provisions set forth in Piedmont's approved tariffs and service regulations.

7. Billing and Payment. Billings to Agent for any amounts due hereunder, and payments by Agent on such billings, shall be made in a manner consistent with the billing and payment provisions of the underlying transportation tariffs pursuant to which service is rendered.

receiving service under any other Company Rate Schedule and for changes in the quantity of Service to be provided under an existing Rate Schedule. At a minimum, such application shall set forth the date of the application, the name of the Applicant, the location of the Premises for which Service is requested, the type of Service applied for and estimated gas consumption. Prior to being obligated to provide Service to Customer pursuant to such application, Company shall conduct an examination and review of Customer's application for Service to determine: (1) that the Company has the operational ability to provide the Service requested, including the requisite upstream supply and/or capacity assets; (2) that the requested Service will not impede or interfere with the Company's ability to maintain Service to existing Customers with the same or a higher priority of service; (3) that provision of the requested Service will not have a materially adverse impact on the Company's ability to recover its approved margin; (4) that provision of the requested Service is economically feasible; and (5) that Customer is creditworthy as determined in accordance with the Commission's Rules and the Company's procedures. Provided that the Company's review and analysis indicates that Service can be provided as requested, the Company will then approve the requested Service. Company shall have no obligation to provide the requested Service absent such approval. N

When the requested Service is to be provided to a Residential, Small or Medium General Service Customer, and the provision of such Service is economically feasible, the application and the Company's acceptance thereof may be oral at the Company's option. In such event, the Company's applicable Rate Schedules and these Service Regulations shall become effective and applicable to any Service rendered to such Applicant in the same manner as if the Company's standard written form of application for Service had been signed by the Applicant and accepted by the Company. Upon the provision of Service by the Company to such Customer, such oral service agreement shall be presumed to exist in any case where there is no written application accepted in writing by the Company.

In the event a Customer receiving Service under the Company's commercial or industrial (large general) sales Rate Schedules anticipates a significant reduction in its gas consumption, it shall provide prompt notice thereof to Company.

Customer Classifications

Residential Rate Service Classification. All Residential Rate Service shall be provided pursuant to the Company's Rate Schedule 301. C D

Commercial Rate Service Classification. All Commercial Rate Service shall be provided pursuant to the Company's Rate Schedules 302 and 352. Classification between Rate Schedules 302 and 352 shall be based on the following criteria:

A. Definitions: As used in Commercial Rate Service Classification, the following terms shall have the meanings assigned below:

(1) "Annual Review Period" shall mean the twelve (12) months ended on December 31 of each year.

(2) "Actual Monthly Usage" shall mean the actual natural gas volumes consumed by the Customer during the highest month of consumption during the Annual Review Period as reflected on the Company's invoices for the Customer.

(3) "Classification Usage" shall mean the usage criteria that establishes the minimum and/or maximum average daily usage that must be maintained in order to receive service under a rate schedule. The classification usage for Rate Schedule 302 shall be less than an average of 20 dekatherms per day. The classification usage for Rate Schedule 352 shall equal or exceed an average of 20 dekatherms per day but be less than an average of 50 dekatherms per day. C

(4) "Involuntary Curtailment Days" shall mean those days or portions of days in the highest month of consumption during a given Annual Review Period where curtailment of the Customer's natural gas service was imposed by the Company's decision to curtail.

(5) "Service Days" shall mean 30 days less the number of Involuntary Curtailment Days.

(6) "Average Daily Usage" shall be the Customer's Actual Monthly Usage within the Annual Review Period divided by the number of Service Days.

B. Procedures:

(1) At the conclusion of the Annual Review Period of each year and prior to June 1st of the ensuing year, the Company will determine for each customer served under Rate Schedules 302 and 352 that Customer's Average Daily Usage. C

(2) Those customers currently receiving service under Rate Schedule 302 whose Average Daily Usage is equal to or exceeds 20 Dekatherms a day, will be transferred to Rate Schedule 352, effective on the first day of June following the most recent Annual Review Period. C D

(3) Those customers currently receiving service under Rate Schedule 352 whose Average Daily Usage in each of the most recent two (2) Annual Review Periods is less than 20 Dekatherms a day, will be transferred to Rate Schedule 302 effective on the first day of June following the second, and most recent, Annual Review Period. C

(4) Those customers currently receiving service under Rate Schedule 302 or 352 whose Average Daily Usage in each of the most recent two (2) Annual Review Periods is equal to or greater than 110% of 50 dekatherms per day will be transferred to Rate Schedule 303, 304, 313, or 314 as applicable. C

C. Exceptions: If a customer currently being billed under Rate Schedule 302 adds natural gas equipment that increases the Customer's Average Daily Usage to the point where the customer will qualify for Rate Schedule 352 the Company may, upon notification from the Customer and subject to installation verification by the Company, transfer the Customer to the new Rate Schedule prior to June 1 of that year. C

Industrial Rate Service Classification. Rate service classification under the Company's Rate Schedules, 303, 304, 313 and 314 shall be based on the following criteria:

A. Definitions: As used in rate service classification, the following terms shall have the meanings assigned below:

(1) "Annual Review Period" shall mean the twelve (12) months ended on December 31 of each year or the regularly scheduled meter reading nearest December 31.

(2) "Actual Monthly Usage" shall mean the actual natural gas volumes sold or transported for the Customer by the Company during the highest month of consumption during the Annual Review Period as reflected on the Company's invoices for the Customer.

(3) "Classification Usage" shall mean the usage criteria that establishes the minimum and/or maximum average usage that must be maintained in order to receive service under any rate schedule. For existing Customers, the classification usage for Rate Schedule 302, 332, 352, 362 shall not exceed an average usage of 55 dekatherms per day. For existing Customers, the classification usage for Rate Schedules 303, 304, 313 and 314 shall exceed an average usage of 45 dekatherms per day.

(4) "Involuntary Curtailment Days" shall mean those days or portions of days in the highest month of consumption during a given Annual Review Period where curtailment of the Customer's natural gas service was imposed by the Company's decision to curtail.

(5) "Service Days" shall mean 30 days less the number of Involuntary Curtailment Days plus the number of days that Customer consumed an alternative fuel to natural gas.

(6) "Average Dekatherm per Day" shall be the Customer's Actual Monthly Usage within the Annual Review Period divided by the number of Service Days.

B. Procedure:

Step 1. During January and February of each year, the Company will determine for each Customer served under Rate Schedules, 303, 304, 313 and 314 the Customer's Average Dekatherm per Day usage for each of the two most recent Review Periods.

Step 2. A Rate Schedule 302 or 352 Customer whose usage is 110% of the 50 dekatherms threshold in the two most recent Review periods will be transferred to Rate Schedule 303, 304, 313 or 314, as applicable. A Rate Schedule 303, 304, 313 or 314 Customer whose usage is equal to or less than 90% of the 50 dekatherms threshold in both of the most recent two Review Periods will be transferred to the appropriate Small or Medium General Service Rate Schedule. Customers receiving service under Rate Schedules 303 or 304 shall be eligible to elect transportation service to be effective with the rate reclassification. C

All changes in rate classification under this section shall be effective on the first day of June following the review.

Step 3. Customers who are reclassified shall be notified of the change in rate schedule, and receive a copy of the tariff sheets applicable to his old and new rate schedules at least 21 days prior to the effective date of the change.

C. Exceptions: If a Customer adds or retires a major piece of gas-burning equipment, changes the hours of operations or otherwise materially alters the Customer's business that will clearly increase, or decrease, the Customer's consumption on an ongoing basis to a level that will change the Customer's ability to qualify the Customer for a particular rate schedule, the Customer shall report such changes to the Company and afford the Company an opportunity to inspect the change in equipment and to meet with the Customer to review and discuss the anticipated future level of consumption. If, after such inspection and meeting, the Company is satisfied that reclassification is appropriate, the reclassification will occur within two months after the new equipment is in place and operational, or the retirement is completed, and the first meter reading reflects the higher anticipated usage resulting from the new equipment or the lower anticipated usage resulting from the retirement. Any reclassification pursuant to this paragraph is subject to correction if actual experience so warrants. If the reclassification results in qualification for service under Rate 303 or 304, the Customer shall provide an election form one week prior to reclassification if a transportation election is

desired. Otherwise, service will be provided under Rate Schedule 303 or 304, dependent upon rate qualification.

Requirements: Upon reclassification from Rate Schedules 302 or 352 to either Rate Schedule 303, 304, 313, or 314, Customer will be responsible for installing and maintaining, at the Customer's expense, a dedicated 110v electrical service in a location suitable to provide electrical service for the Company's telemetering equipment. C

Applicable Documents Defining Obligations of the Company and its Customers

The obligations of the Company to provide Service and the obligations of the Customer upon receipt of Service are governed by and set forth in (a) applicable statutes, including those set forth in Chapter 65 of the Tennessee Code Annotated, (b) applicable Tennessee Regulatory Authority Rules, Regulations, and Orders, (c) applicable tariffs or Rate Schedule(s), (d) these Service Regulations, (e) any application, agreement, Special Contract, or similar document executed by Customer and approved, as necessary, by the Authority pertaining to such service, and (f) any standard operating procedures of the Company reasonably necessary for the provision of such Service and administered on a nondiscriminatory basis. Copies of Chapter 65 of the Tennessee Code Annotated, applicable Authority Rules, Rate Schedules, and these Service Regulations are available from the Company for public inspection, as are copies of forms of applications, agreements, and other documents approved by the Authority. A copy of the Authority's Rules are available at the Authority's Web Site at www.state.tn.us/tra/. Unofficial copies of the Company's Rate Schedules and Service Regulations are also available at the Company's Web Site at www.piedmontng.com.The Company shall provide all new non-residential Customers with a copy of the applicable Rate Schedule(s) and written application for Service and/or other documents executed by the Company and the Customer pertaining to such Service. After a Customer has executed a written application and/or contract, no promise, statement or representation by an employee or agent of the Company or by any other person inconsistent with the written application and/or contract shall bind the Company to provide Service or to change the terms and conditions upon which Service will be rendered unless the same is in writing and is executed by an authorized representative of the Company. In the event there is a conflict between these Service Regulations and the provisions of the applicable currently effective Rate Schedule, the provisions of the Rate Schedule shall govern. The Authority Rules shall govern in the event of a conflict with these Service Regulations. The Company may not make any representation that conflicts with Authority Rules, its Rate Schedules or these Service Regulations. N

Applicable Documents Subject to Change

All of the documents defining the obligations of the Company to provide Service and the obligations of the Customer upon the receipt of Service are subject to change from time to time upon order of or approval by the Authority and by other duly constituted governmental authorities. The Company does not undertake to advise any Customer of any such change except as may be required by the Commission or other duly constituted governmental authority. N

Priority of Service

The Company has established the following categories of service in order of priority:

1. Residential, small commercial (less than 50 MCF on a peak day), school, hospital, police protection, fire protection, sanitation, or correctional facility requirements
2. Essential agricultural requirements
3. Large commercial requirements (50 MCF or more on a peak day), firm industrial requirements for plant protection, feedstock and process needs, pipeline customer storage injection requirements, and firm industrial sales up to 300 MCF per day
4. All industrial requirements not specified in 2, 3, 5, 6, 7, 8, 9 or 10
5. Firm industrial requirements for boiler fuel use at less than 3,000 MCF per day, but more than 1,500 MCF per day, where alternate fuel capabilities can meet such requirements
6. Firm industrial requirements for large volume (3,000 MCF or more per day) boiler fuel use where alternate fuel capabilities can meet such requirements
7. Limited Availability requirements of less than 300 MCF per day, where alternate fuel capabilities can meet such requirements
8. Limited Availability requirements of more than 300 MCF per day but less than 1,500 MCF per day, where alternate fuel capabilities can meet such requirements
9. Limited Availability requirements of intermediate volumes (from 1,500 MCF per day through 3,000 MCF per day), where alternate fuel capabilities can meet such requirements
10. Limited Availability requirements of more than 3,000 MCF per day, but less than 10,000 MCF per day, where alternate fuel capabilities can meet such requirements
11. Limited Availability requirements of more than 10,000 MCF per day, where alternate fuel capabilities can meet such requirements.

Meter Turn On

There is no charge for meter turn on for a new customer. There will be a flat charge for meter turn on for an existing customer or member of same family or household. For turning on meters shut off for non-payment of bills there will be a flat charge for meter turn on plus payment of all past due bills. The Company may also secure an additional customer deposit. If an existing customer requests that his/her meter be turned off for the summer to

avoid minimum bills during the summer period and then requests the Company to turn the meter back on, the flat charge for meter turn on will apply.

Gas Wastage (1220-4-5-.06(iv))

Excessive gas consumption without knowledge by the customer may possibly be the result of gas leakage or appliance malfunction. Gas bill adjustments generally will not be permitted for improper and/or inefficient operation of gas appliances or for gas leaks. Adjustments for all special cases will be based upon individual merit dependent upon such factors as prompt action by the customer, the nature of the problem, maintenance of facilities by the customer, the time period involved, etc. An example might possibly be a hot water relief valve stuck open or a broken hot water line on a gas water heater. All such special adjustments shall not exceed 35% of the wastage and shall be approved by the Director of Customer Service (residential) or the General Manager of Marketing (commercial). Wastage shall be based on Service Department inspection or Customer Service Department researches. The Director of Customer Service shall determine consumption rates. Duration of the adjustment shall not exceed 30 days. Where such gas appliance malfunction or gas leakage was directly caused by actions of Company personnel or occurred within 30 days of the date the work was performed by Company personnel, the Company will grant 100% credit of wastage to the customer. The amount of wastage will be approved by the Director of Customer Service and not exceed a period of 30 days. C

Title to Facilities

The title to all facilities including mains, gas service lines, meters, and accessory equipment up to and including the outlet of the meter assembly shall be vested in the Company, notwithstanding any charge which may be made to the customer for extending service.

Appliance Classifications

Major appliances

- natural gas heating systems utilized as primary heating source in the structure
- gas air conditioners
- gas water heaters

Minor appliances

- clothes dryers
- gas fireplaces
- gaslights
- grills
- incinerators
- log starters
- logs

- ranges
- swimming pool gas water heaters

General Installation / Connection & Repair Policy

The Company will provide equipment, labor, and materials to install, repair, and service gas-fired equipment. Such installations, repair, or service shall be charged at Company's standard rates and charges. The installations and repairs will be performed in accordance with all applicable codes and licensing requirements. The Company reserves the right to decline such work, on a non-discriminatory basis, if the conditions involved in such work are not consistent with the safe or efficient completion of such work. All natural gas appliance installations on Company lines shall comply with the current version of the International Fuel Gas Code adopted by local authorities. All appliances installed, repaired or serviced by Company must also be tested and approved by US safety standards and used in accordance with the manufacturer's listing. The Company reserves the right to refuse to connect those appliances which, in its judgment, do not conform to appropriate safety requirements. C

D

Water Heaters

The Company will install and repair, including dip tube replacement, residential water heaters on the basis of its standard rates and charges. For repairs of commercial gas water heaters, the customer is to be referred to local dealer or plumber. C

Dryers

The Company will install and repair residential dryers on the basis of the Company's standard rates and charges. Repair requests on commercial gas clothes dryers, other thermocouples or other parts normally stocked by our storeroom, will be referred to the appropriate dealer for servicing. C

Gas Grills

The Company, as part of its free service program, will make burner air and gas adjustments, check controls, and assist in problem diagnosis on a no-charge basis. Installations of and repairs on gas grills will be charged on the basis of the Company's standard rates and charges. Cleaning and painting of the grill will be the responsibility of customer. The Company may also perform the following on the basis of the Company's standard rates and charges: C

1. Post Replacement:;
2. Repairs to Cut or Damaged Tubing;
3. All Other Repairs.

Gaslights

With regard to gaslights, the Company will turn on, re-light and replace mantles without charge to the residential customer. Should the residential customer wish to replace the mantles himself, the Company will, upon request, mail to him replacement mantles for residential use in his gaslights without charge. Residential customers may also pick up free replacement mantles for use only in their gaslights at the Company's storeroom. The same gaslight service policies apply to commercial/industrial customers except they will be charged for the mantles. Subdivision entrances and multi-family developments do not qualify for residential use. Services do not include the painting of gaslights or glass cleaning; these are considered the owner's responsibilities.

The Company will recondition the customer's gaslight, including replacement of mantles, cleaning and/or replacement of glass panes as required, and painting repair of gaslight as necessary, for a flat labor charge plus cost of replacement parts (other than mantles). In the case of multiple gaslights on the same piece of property, the labor charge shall apply only to the first light. For each additional light on the same property, an additional charge plus parts (other than mantles) will apply. The same policy applies to commercial customers except they will also be charged for mantles. Installation of and repairs on gaslights, including those listed below, will be charged on the basis of the Company's standard rates and charges. The Company may also perform the following: C

1. Post and/or Light Head Replacement: All customers needing to purchase a gaslight head will be referred to the Home Energy Center;
2. Repairs to Cut or Damaged Tubing: A service representative can sometimes perform this work, but generally a three-man fitting crew is required.
3. Complete Replacement: The customer shall be referred to the Company's Home Energy Center. If the customer provides a replacement light head and post of the same basic type, the Company will connect the replacement;
4. All Other Repairs.

Gas Logs & Log Starters

All installations of or repairs on gas logs and log starters will be charged on the basis of the Company's standard rates and charges. C

Other Miscellaneous Residential Gas Appliances

All installations of or repairs on other approved gas appliances will be charged on the basis of the Company's standard rates and charges. C

D

Appliance Parts Broken by Company Personnel

From time to time when our service personnel are repairing a customer's gas appliance, other adjacent parts become broken during the course of the repair. Such instances leave a question as to whether the customer should be charged for that additional part. Such decisions shall be at the discretion of the supervisor involved. The following guidelines should be of assistance.

No Charge to Customer

1. Breakage caused by negligence on part of our personnel. In such cases, the employee will be counseled to avoid repetition.
2. Accidental breakage of part considered "relatively new" and our representative was using care and attention to work procedures.

Charge to Customer

1. Parts that may be broken after customer first being warned that we will use care in repair but the customer will be responsible for all parts involved. If the service representative has doubts about the condition of the appliance, he should so warn the customer initially.
2. Any parts broken which are not "relatively new" and in process of normal repair with our representative using reasonable care in work procedures. Where we make a mistake we'll stand behind it, but we will not unilaterally absorb the cost of other parts broken, they will be considered part of the job.

Sales to Employees

The following is applicable for active permanent employees, retired employees and retiree's surviving wife or husband until such time as survivor remarries:

1. Employees may purchase Natural Gas Appliances and accessories at cost from the Company. Appliances must be purchased for use only in the employee's own home. C
2. Pipe, pipe fittings and similar material carried in stock by the Company may be purchased by employees at warehouse cost, but these also must be used in the employee's own home and all such purchases must be approved by the Company. C

There is no intent in these rules for employees to unfairly benefit from Company discounts. The giving of false information to obtain a discount from the Company will be considered a cause for discipline.

D

Liquid Propane Conversion to Natural Gas

Any new conversion customer converting from liquid propane (LP) to natural gas will receive gas service line and meter installation on the same basis as any other residential or commercial customer. C

Residential

Conversion of residential gas dryers, grills, logs, furnaces or other appliances shall be performed on the basis of the Company's standard rates and charges. C

Commercial

Conversion of AGA approved residential gas appliances or commercial gas appliances in a commercial structure will be performed on shall be performed on the basis of the Company's standard rates and charges. C

Piedmont Natural Gas Company, Inc.,
Tennessee Service Regulations

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Temporary Conversions to Liquid Propane

When deemed necessary by the Company, new construction and conversion customers will be temporarily converted to liquid propane at no charge. The conversion back to natural gas will also be performed by the Company at no charge.

Piedmont Natural Gas Company, Inc.

Company's Tennessee Service Regulations

Section 2 – METERS

Installation & Location

The Company performs standard meter installation at no charge to the customer. However, a customer desiring an underground meter installation will be charged for the additional cost. The most desirable and serviceable location for a new residential meter installation is on the outside of the structure, approximately four feet past the front wall, where it is not subject to damage from automobiles. The new meter shall be so located unless it is physically impractical or it interferes with customer's use of his property. C

The proper meter location for large outside commercial or industrial meters, especially those having multiple structures, is at the property line wherever possible. Under no circumstances shall a meter be located within 10 feet of a combustion air intake. Further, meters shall not be located within 3 feet of an ignition source such as heating or air conditioning equipment, water heaters, electric meters, switch gear, electric panels, etc.

The customer or owner must at all times provide a proper and accessible location for all meters and regulators. The following rules apply as well:

1. All meters installed on high-pressure services must be installed outdoors.
2. All "farm tap" meters shall be located at the main.
3. All meters served from standard and medium pressure mains shall be installed outdoors, except in those instances in which it is extremely difficult to do so or is very undesirable from the customer's viewpoint. In such cases, the meter may be installed indoors, at the discretion of the Company, if the installation conforms to applicable codes.
4. If a customer desires to use gas solely for swimming pool water heating, the meter shall be located at the house and the fuel line run from this point to the pool heater.
5. If located indoors, the meter shall not be located:
   a. Above the ground floor
   b. Less than 3 feet from a hot air furnace or boiler
   c. Less than 3 feet from a gas oven or hot water heater
   d. On or under stairways
   e. In bathrooms or adjoining clothes closets
   f. In small, unvented, or confined spaces
   g. Where subject to damage, extreme high temperature, or corrosion
   h. In entrances or exits so as to obstruct passage in any way
   i. Less than 10 feet from boilers or other sources of heat, if the meter capacity is 80B or larger

Meter Relocation

Outside meters will be relocated when requested by the customer, however, the customer will be charged Time and Material.

Meter Testing

The Company maintains a regular program of meter testing and change-out to insure metering accuracy. Upon written request from the customer for a special test of his meter, the Company will inspect the meter at a reasonable time in accordance with provisions of Rules, Regulations and Statutes Governing Public Utilities as issued by the Tennessee Regulatory Authority. Such meters will be considered to register correctly if the error is not greater than plus or minus two percent (2%). If the meter is found to be registering incorrectly, the meter will be repaired or adjusted to conform to standards with no charge to the customer for testing or repair. If the meter is registering correctly, there will be a meter testing charge to the customer.

Meter Tampering or By-pass

The term "metered gas" is defined as "all gas that has passed through the customer's meter." It is Company policy to prosecute those persons involved where the Company finds evidence of meter tampering or by-pass. Such acts are illegal, as well as extremely dangerous, and Tennessee State Law provides for substantial punishment. In such cases, the customer or party involved will be charged for all gas used and the cost of meter repair including travel time and all other related expenses on a "Time and Materials" basis. At the Company's option, gas service may also be terminated. C

Meter Damage

The customer has a responsibility to provide reasonable protection for the Company's metering facilities from damage by his employees, customers, and the general public. It is not, however, his equipment and he cannot be expected to provide security such as guards, surveillance, enclosures, etc. to protect the Company's meters from acts of vandalism or from the general public. The Company selects and approves meter locations. C
If a location is in a drive, parking lot, alley, etc. where damage is likely, then it is the Company's responsibility to provide adequate protection such as posts, etc. In cases where the Company's metering facilities are damaged, with regard to actual damage responsibility, the following applies:

1. If the customer or his employees cause damage (accidentally or purposely), then the customer should be billed for damages.
2. If a visitor, commercial vehicle, or general public vehicle damages a meter, damage relief should come from that person or firm causing the damage. Damage relief shall not come from the customer, unless it can be proven that the damage by a third party resulted from negligence on the customer's part.

Piedmont Natural Gas Company, Inc.

Company's Tennessee Service Regulations

Section 3 – FUEL LINES

Customer gas fuel lines installed on Company mains shall comply with all applicable codes and provisions of the current version of the International Fuel Gas Code adopted by the county in which the gas facilities operate. The care and maintenance of all customer-owned underground fuel lines is the responsibility of the customer. All piping carrying metered gas is considered a fuel line. When in place in a finished building, hidden from view and not easily accessible, the piping is considered a concealed fuel line. All fuel lines will be (a) standard threaded and coupled or welded steel minimum schedule 40 pipe (depending on operating pressure), or (b) plastic pipe or tubing of the following types: TR-418 PE 2306 – orange color, Drisco 7000 or 8000 PE 3406 – black color, or approved equal. N

Fuel Lines May

- Be installed underground in accordance with applicable codes to include corrosion protection.
- Be installed to serve any number of buildings if all the buildings are located on a single or continuous tract of land with common ownership.
- Be concealed if installed in accordance with applicable codes.

Fuel Lines May Not

- Be smaller than 1-1/4" coated steel or 1-1/8" x.090 wt Polyethylene (PE) tubing if installed underground (unless serving only gaslights, grills, or logs). Fuel lines to remote heating units may be smaller as approved by the Service Department. The Service Department will determine the size of fuel lines for mobile homes.
- Extend to or across property under different ownership.
- Cross any public street, alley, or highway. Fuel lines shall be sized to have a minimum pressure drop between the meter outlet and any appliance of 0.3-inch water column. Those fuel lines served from standard pressure distribution systems will be sized on 0.2-inch water column pressure drop.

Installation Charges

All fuel lines will be installed at the customer's expense with one exception: when determined necessary, the Company may choose to install a fuel line instead of a service line. In this event, ownership with maintenance responsibility shall remain with the customer. In such cases, footage of fuel line installed shall be equal to the footage of service line that would be "free service" if the customer were served in the usual manner (a "farm tap" customer is an example). Charges for residential underground fuel lines will be on the basis of the Company's standard rates and charges. Pre-installation estimates may be obtained from the Service Department (for plastic tubing) or the Construction Department (for all other underground fuel lines). The customer at his expense will replace N

any sidewalk or pavement cut. The customer will be charged on the basis of the Company's standard rates and charges for all fuel line repairs made by the Company.

Commercial or Industrial Fuel Lines

Commercial or Industrial fuel line piping work will be performed by the Company according to applicable codes and licensing requirements. If the Company installs a customer's underground fuel line, the charges will be based on the Company's standard rates and charges. N

Piedmont Natural Gas Company, Inc.

Company's Tennessee Service Regulations

Section 4 – SERVICE LINES

Service lines are pipes used to carry unmetered gas from the main to the customer's meter. The preferred route of the service line will be from the nearest adequate main to four (4) feet beyond the customer's nearest building wall. Service lines, service relocations, and extensions may be installed in accordance with applicable codes by either the Company or by a contractor approved by the Company. The complete installation must be inspected and approved, prior to being backfilled, by the appropriate Company representative. In general, service lines should not be laid on vacant property adjoining the building to be served if there is likelihood that a building will be constructed on the vacant property. Service line installation policies are subject to conditions of gas supply and the Company's limited service attachment programs.

Customer Types

Residential

The Company will install free of charge 100 feet of service line for one major appliance, as defined in Section 1, where no main extension is required. The gas service line must extend along the route selected by the Company. In the event that the above conditions are not met, the service line installed for the customer must provide a reasonable return to the Company. If the customer wishes the facilities to be constructed along a route other than the route selected by the Company and/or if the gas service line is more than the length allowed above and/or the service to be rendered to the customer will not produce a reasonable return to the Company, the Company may require the customer to pay the excess cost of constructing the facilities along the alternate route or in excess of the footage allowed and/or to make a contribution which will permit the Company to earn a reasonable return. In all cases any pavement or sidewalk cut will be replaced by and at the customer's expense.

Commercial or Industrial

For permanent use and where revenues provide a reasonable return to the Company, the Company will install free of charge 100 feet of service line measured from customer's property line or four feet past the nearest building wall, whichever is less.

Exceptions

In cases where there is exceptional cost due to length of service, high pressure main, paving (such as crossing major street), rock, etc., these service orders shall be reviewed by the Engineering Department on a case-by-case basis to determine if they meet the main extension policy provided in Section 5. N

Piedmont Natural Gas Company, Inc.

Company's Tennessee Service Regulations

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Excess Service

Excess service refers to that portion of the total cost of a service line installed for a customer that is in excess of the Company's justifiable investment and is that portion of service line cost paid for by the customer.

Repairs

Repairs to service lines damaged by others shall be charged at the Company's actual repair costs.

Service Extensions

A service extension includes all piping carrying unmetered gas from the termination of the previous service line to the inlet of the meter. Service extensions and relocations shall be installed at the customer's expense.

Branch Services

Branch services will be permitted only when the point of junction of the two services is either in the public right-of-way or on a customer's property. In the latter case, written and notarized permission of the property owner must be obtained and filed with the Register of Deeds of the appropriate county. In the case of services requiring in-line valves, the service must be branched in the public right-of-way, and the Construction Department must confirm presence of a valve in each branch.

Multiple Buildings on Same Lot

In those cases where two or more buildings are located on the same lot in such a manner as to be reasonably suited to subdividing, the Company will, if requested, run separate service lines to these buildings. However, if the buildings are not so situated (e.g. garage apartments or combination commercial and residential buildings), the Company will not run separate services except where the full cost of the additional service from main to meter, including paving, is borne by the customer.

Service Line Enlargements

If the load through an existing service is so increased as to require a larger service line, the Company will enlarge the existing service to a point four (4) feet beyond the customer's nearest outside building wall without charge. Any enlargement of the service line beyond this point will be at the customer's expense. Any fuel line changes will be at the customer's expense.

Shopping Centers

A shopping center shall be considered as a single structure containing a minimum of 7,500 square feet of floor space and a minimum of four (4) tenants or business stores operating within the structure. The Company shall install one service line and one bank of gas meters for each 12,000 square feet of floor space. The final number of meter banks shall

be at the discretion of the Company, based upon the size and layout of the particular shopping center under consideration. C

Piedmont Natural Gas Company, Inc.

Company's Tennessee Service Regulations

Section 5 – MAINS

The Company has a policy of extending its main(s) to serve a new customer (or customers) provided such main extension is determined to be economically feasible. The criteria for economic feasibility shall be met when the total annual net revenue to be obtained from the customer (or customers) provides a rate of return that is equal to or greater than the overall cost of capital established in the Company's last general rate case.

The determination of the anticipated rate of return on the main extension will be based on a net present value (NPV) computation utilizing the following parameters:

1. Net revenues will be calculated by applying the applicable tariff margin rate to the estimated annual total usage and, where applicable, potential for future growth may be considered.
2. Estimated annual total usage shall be based on those appliances that will be in use during the first five (5) years of service, except as provided in paragraph 3 under "Main Extension Contract".
3. The required investment will be based upon engineering cost estimates as determined by the Company and will include the costs of all facilities required for providing service including material and labor costs associated with the installation of mains, service lines, metering and regulating equipment, easements, rights of way, street crossings, and all other required equipment or facilities.
4. The discount rate shall be equal to the overall cost of capital allowed in the Company's last general rate case adjusted for taxes and depreciation.
5. The discount period shall be equal to the economic useful life of the investment in the mains and services.
6. Main extensions producing a positive net present value at the end of the discount period shall be considered economically feasible.

Main Extension Contract

To the extent the net present value computation produces a negative result:

1. The customer shall pay to the Company an amount equal to the negative net present value at the end of the discount period, plus any additional funds required to provide for the payment of resulting taxes. This payment may be made in a lump sum or in periodic payments (without interest) -- annual, monthly, etc. C
2. If within three (3) years after the original installation, the customer making the payment adds additional major or minor appliances, the Company will refund to the customer (if paid in advance or credit his account if on extended terms), upon written request, an amount equal to the net annual revenues anticipated to be realized from the usage of the additional appliance(s).
3. In no case shall the customer making the payment be refunded more than he paid.

The above provisions assume that only one customer will make the payments. If two or more customers make the payments, the contract will be adjusted to reflect this fact; for example, if two customers made equal payments and a refund is due because one of the two has added an additional appliance, then the entire refund shall be paid to him.

Exceptions

The Company may make exceptions to the main extension rule when system improvements are realized by the extension.

Main Relocation

If a customer requests a re-routing or relocation of a main located on a public right-of-way, the customer will be charged for this work. If the main is located on private property, such as an easement, railroad right-of-way, the case will be referred to the Engineering Department for determination as to whether a charge shall be made. The same will apply to relocations or re-routings requested by a contractor. Repairs to mains damaged by a contractor will be charged to the contractor on a "Time and Materials" basis.

Aboveground Facilities

If the above-ground facilities (such as post regulators, vent pipe, etc.) are so located that they seriously interfere with, or make impracticable, the owner's use of this property, the relocation of such facility will be done at no cost to the customer. An example of serious interference would be when the aboveground facility was located in front of a proposed narrow driveway. In all other cases, the cost of relocation will be charged to the customer. The charge, unless specified for any of the above items, will be either of the following, at the customer's option, prior to commencement of work: [C]

1. Estimated cost as determined by the Construction Department
2. Actual cost

Piedmont Natural Gas Company, Inc.

Company's Tennessee Service Regulations

Section 6 - Rules and Regulations Governing Supply & Consumption of Gas

The consumer agrees to the following rules and regulations, having made proper application and deposit for service with the Company.

1. Consumer is responsible for damage to any gas meter or equipment belonging to the Company placed on the premises occupied by the consumer and will immediately reimburse the Company for all costs of repairing or replacing same. In accordance with Item (1), Section 1220-4-5-. 18, Reasons for Denial of Service of the Tennessee Regulatory Authority's Rules and Regulations, a consumer may be refused service if consumer has damaged the Company's equipment or tampered with the lock on a meter. The Company will charge its standard rates and charges for a broken meter lock. C
2. Consumer will use gas supplied through Company's meter only. Use of other metering devices or bypassing equipment and tampering or adjustments on company-owned metering facilities by consumer are prohibited. The Company will not permit secondary meter billing.
3. In case the meter has failed to register the quantity of gas consumed, in whole or in part, the consumer will pay such reasonable sum as is ascertained to be due for the period involved.
4. The Company's authorized agents shall have access to consumer's premises at all reasonable times for the purpose of checking, reading, servicing, and disconnecting the meter; shutting off gas; and for such other purposes as the Company may deem advisable to protect its interests.
5. The Company shall be under no duty to inspect, repair, or maintain the service of other pipes, connections, equipment, or appliances located beyond the meter outlet on the premises of the consumer.
6. The consumer shall be liable and shall pay for all gas passing through the meter until it is turned off. When termination of service is requested, consumer must ensure that the Company receives either written or verbal notice at least two business days prior to the desired date of termination. Access to the meter must be provided. C
7. The consumer is entitled to the usual discount allowed by the Company if bills are paid within the first twelve days following the date bills are rendered. All gas bills are due when rendered and they will be considered as rendered when mailed to the address specified by the consumer. A residential, head of household consumer dependent on social security or other retirement check may request a net to gross discount waiver. Qualified consumers will be granted a net to gross discount waiver and the account will be monitored for continuing compliance.
8. The Company shall have the right to shut off gas from any consumer who may be in arrears for a longer period than twenty days in paying for gas furnished hereunder or under any other prior or subsequent agreement, or for gas used by consumer at

consumer's present or any prior or subsequent address, it being understood hereby that said twenty day period commences to run from date the bill is rendered as above defined. The Company will not shut off gas for non-payment without first mailing a notice to the consumer giving him seven days to pay for the bill in arrears. The Company will not terminate service during any 24-hour period, as measured from 8:00 am on the planned date of termination, where the forecasted low temperature, as determined by the National Weather Service, is 32 degrees Farenheit or below.

9. The Company is authorized to require the consumer to make a deposit, or increase any existing deposit, in such amount as the Company deems proper for its protection before restoring gas service. The deposit amount will not exceed two consecutive billing periods or ninety (90) days, whichever is less.
10. All consumer deposits will accrue simple interest on the principal at the rate approved by the Authority. D
11. The Company will charge $55.00 during the months of February through August and $85 for the months of September through January for turning on a meter for an existing consumer or member of the same family or household at same address. This charge applies only to those consumers who have previously elected to have the meter turned off without discontinuing service or whose account has been closed because of non-payment of a bill.
12. In the event gas is shut off because of consumer's failure to pay, a charge will be made for each restoration. The Company will charge $55.00 during the months of February through August and $85 for the months of September through January plus payment of past due gas bills for turning on meters shut off for non-payment of bill. The Company will not be liable for damages for shutting off gas or for delay in restoring service. An additional deposit may also be required.
13. At the Company's option, special discounts may be offered to the approved reconnect fee to encourage customers to have their service reinstated during non-peak turn-on periods. Such special discounts will be made upon a 1 day notice to the Authority and will be available on a nondiscriminatory basis within the classifications of Sections 11 and 12 above. Notification will include the time period during which the promotion will be conducted as well as the terms and conditions of the promotion.
14. The consumer agrees to notify Company in advance of any planned change in physical premise or environment around meter or service to determine impact on safety cases, meter reading, and meter maintenance.
15. In the event the Company is unable, wholly or in part, by reason of force majeure to carry out its obligations to provide service, the obligations of the Company so far as they are affected by such force majeure, shall be suspended during the continuance of any inability so caused but for no longer period, and such cause shall as far as possible be remedied with all reasonable dispatch. The term "force majeure" as employed above shall mean acts of God; extreme weather conditions; strikes, lockouts, or other industrial disturbances; acts of the public enemy; war; blockades; insurrections; riots; epidemics; landslides; lightning; earthquakes; fires; storms;

floods; washouts; arrests and restraints of governments and people; civil disturbances; explosions; breakage of or accidents to machinery, lines of pipe, or the Company's peak shaving plants; freezing of wells or lines of reduction in gas pressure by its suppliers; inability to obtain rights-of-way, permits, materials, equipment, or supplies for use in the Company's peak shaving plants; and any other causes whether of the kind herein enumerated or otherwise, not within control of the Company, and which by the exercise of due diligence the Company is unable to prevent or overcome. It is understood and agreed that the settlement of strikes or lockouts shall be entirely within the discretion of the Company, and the above requirement that any force majeure shall be remedied with all reasonable dispatch shall not require the settlement of strikes or lockouts when such course is inadvisable in the discretion of the Company.

16. When the Company in its discretion determines that it is necessary to curtail service to maintain the integrity of its distribution system or to provide for its or the public's safety, the Company shall have the right to curtail delivery of gas to any consumer.

17. In the event of a failure or interruption of service, the Company shall use all reasonable diligence to remove the cause or causes thereof, but the Company shall not be liable for any loss or damage resulting from such failure or interruption due to accidents, force majeure, extreme weather conditions, or causes beyond its control.

PIEDMONT NATURAL GAS COMPANY, INC.
CNG IR
TRA DOCKET NOS. 14-00086 & 14-00087
SUPPLEMENTAL RESPONSES TO
TENNESSEE FUEL AND CONVENIENCE STORE ASSOCIATION
DISCOVERY REQUEST NO. 1
Date Issued: October 14, 2014

19. To the extent not previously provided, please provide electronic copies (on CD) of all tables, charts, diagrams, schedules, and exhibits (collectively, "Exhibits") contained in the testimony of Ken Valentine of Piedmont. Please include all workpapers, schedules, underlying computations and supporting documentation used and/or relied upon by Witness Valentine in the preparation of his testimony, including the preparation of all Exhibits. Please provide all electronic spreadsheets with cell formulas, cell references, macros and VBA code intact.

Response: Piedmont has no documents responsive to this request.

Response provided by Piedmont Natural Gas on October 23, 2014.

Supplemental Response: The following website references were used in the preparation of Witness Valentine's rebuttal testimony:

http://www.socalgas.com/regulatory/tariffs/tm2/pdf/GO-CMPR.pdf

http://le.utah.gov/xcode/Title54/Chapter4/54-4-S13.4.html?v=C54-4-S13.4_1800010118000101

http://www.njng.com/save-energy-money/ngv/ngvbrochure.pdf

http://www.portal.state.pa.us/portal/server.pt/community/act_13?20789/natural_gas_vehicle_program/1157504

http://www.afdc.energy.gov/fuels/natural_gas.html

http://www.afdc.energy.gov/fuels/natural_gas_benefits.html

Page 8, line 22 to page 9, line 3 in Witness Valentine's rebuttal testimony refers to PSNC's Rate Schedule 135, which has been attached as a supporting document along with all exhibits from Witness Valentine's rebuttal testimony.

Response provided by Piedmont Natural Gas on December 30, 2014

RATE SCHEDULE NO. 135

NATURAL GAS VEHICLE FUEL

This Rate Schedule is available to Customers for the consumption of Gas as a motor fuel. Service under this Rate Schedule shall be metered by PSNC for purposes of providing public access to compressed natural gas fueling facilities. The nature of Service provided under this Rate Schedule is interruptible sales Service.

Rate

The applicable Energy Charge is set forth in the currently effective Summary of Rates and Charges of this Tariff and is incorporated herein by reference.

The rates shown on the Summary of Rates and Charges for this Rate Schedule do not include applicable federal, state, or local highway motor fuel use taxes. Charges at the filling stations will include such taxes.

Payment of Charges

Charges shall be paid at the time of Service with a valid credit or debit card accepted by PSNC, except that Customers who have been issued an access key by PSNC will be billed on a monthly basis. Such bills are due and payable upon receipt and become past due 15 days after the billing date. Late payment charges will be added to the total balances in arrears on the next billing date at the rate of 1% per month. A charge will be imposed for checks and drafts returned to PSNC. Reconnection charges will be made to restore Service for Customers whose Service was discontinued for nonpayment of bill.

The charges above are set forth in the currently effective Summary of Rates and Charges of this Tariff under the heading of Miscellaneous Fee Schedule and are described in PSNC's approved Rules and Regulations.

Rules and Regulations

Service under this Rate Schedule is subject to all lawful orders, rules, and regulations of duly constituted governmental authorities having jurisdiction over either PSNC or Customer, or both, including any orders of the Commission requiring PSNC to curtail or discontinue Service hereunder or setting priorities for such curtailment or discontinuance of Service. PSNC shall not be liable for any damages that may result to Customer or any other person, firm, or corporation by reason of PSNC's curtailing Service in accordance with any order by a duly constituted governmental authority or in accordance with any order of priorities which may be deemed practicable under existing conditions by PSNC. Service under this Rate Schedule is subject to PSNC’s Rules and Regulations as approved by the Commission, which are incorporated herein by reference.

EXHIBIT __(KTV-1)

Atlanta Gas Light Company
Compressed Natural Gas Infrastructure Program

I. Introduction

The Atlanta Gas Light Company (AGL or the Company) Compressed Natural Gas (CNG) Infrastructure Program (Program) is intended to stimulate development of CNG vehicle fueling stations (CNG Stations) in Georgia. The program was approved by order of the Georgia Public Service Commission (GPSC or Commission) on November 29, 2011 and is available to eligible AGL customers anywhere on AGL's distribution system.

The Program will consist of two phases:

1. Phase I – AGL will use $11.57 million from the Universal Service Fund (USF) to provide the compressor(s), storage, controls, etc. (CNG Equipment) at CNG Stations developed under the program. Funding of CNG Equipment under Phase I of the Program will be available for five years, or until the $11.57 million is depleted, whichever comes first.

2. Phase II - Proceeds from commercial activities at the Phase I stations will be used to fund three additional activities.

Under this Program, AGL will not sell CNG directly to retail customers and will not provide land for the CNG Stations. Instead, AGL will install, own, and maintain CNG Equipment for project developers such as fueling services companies, fleet operators, city/county governments, other private enterprise, or any combination of the above (Project Applicants.) The Project Applicants will be required to provide the land, make any necessary site improvements, install and maintain the CNG dispenser(s) and card reader(s), and perform the CNG Retailer function. For the purposes of this program, the customer-owned dispenser(s) and card reader(s), when combined with the AGL-owned CNG Equipment, shall collectively be referred to as the CNG Fueling Infrastructure.

AGL will issue a Request for Proposals (RFP) on or before March 1, 2012. Project Applicants will have the opportunity to submit an application in response to the RFP for CNG Equipment to be approved for their project(s). Project Applicants must meet minimum eligibility requirements and all potential contracting parties must be properly identified. If any of the appropriated $11.57 million remains available for investment following completion of the RFP process the remaining funds will be available thereafter on a first come-first served basis under the same requirements for the balance of the five years.

Although the Program is generally predicated on all the stations being publicly accessible (Public Access Stations), 25% of the appropriated USF funds will be set aside to establish CNG Stations that may allow only limited or no access to the general public (Limited Access S tations.) Limited Access stations will be evaluated separately during the application process and any funds remaining from this up-to-25 percent set-aside will be available on a first come, first served basis to any qualified project applicant.

The USF funds appropriated by the Commission for the Program will reimburse AGL for the installed cost of the CNG Equipment and all resulting income tax liability from these payments, as state law requires such payments from the USF to be treated as Contribution in Aid of Construction (CIAC) payments. Installation of any necessary gas mains, service lines, and metering equipment to provide gas delivery service to the CNG Station will be handled in accordance with AGL's Rule 8 Non-residential Extension Policy and by a separate standard Non-residential Extension Agreement.

AGL will bill CNG Retailers for distribution and compression services (CNG Services) provided at the CNG Stations under the new CNG-1 rate. The CNG-1 rate schedule includes the same delivery charges as AGL's V-52 rate, but replaces the V-52 facilities charge with an O&M charge and Equipment Usage Fee (EUF.) The O&M charge will allow the Company to recover actual costs incurred from providing CNG Services, such as preventive maintenance, repairs, electricity, etc. and will be tracked and billed separately for each CNG Station. The EUF will be calculated based on a percentage of the installed cost of AGL's CNG Equipment, and adjusted on a monthly basis, depending on utilization of the CNG Equipment at each CNG Station. The

revenue from the EUF will be collected by AGL and held in a Reserve Account maintained by the Company to fund the three Phase II activities.

The three Phase II activities are an integral part of the overall CNG Program and will be funded from the proceeds of the EUF paid to AGL by CNG Retailers.

1) Funds held in reserve for eventual replacement of Phase I CNG Equipment
2) Lease buy-down for Home Refueling Appliance (HRA) program
3) Additional Stations under Phase II

II. Minimum Qualifying Criteria and Contractual Requirements

Project Applicants must identify the contracting parties who will enter into the following two agreements with AGL and meet the associated minimum qualifying criteria (including the proposed use of any subcontractors):

1. CNG Retailer Agreement – The CNG Retailer must perform the CNG Retailer function for an initial term of five (5) years and also agree, at a minimum, to the following:

    a. Meet all licensing and other requirements to operate as a CNG Retailer;
    b. Purchase natural gas from a certificated marketer and obtain CNG Services under AGL's CNG-1 Rate;
    c. Own, install and maintain CNG dispensers and card readers;
    d. Perform all activities necessary to process commercial transactions for retail customers using major fleet cards and standard bank credit cards, such as MasterCard and Visa;
    e. Post a CNG retail price expressed in dollars/cents per Gasoline Gallon Equivalent (GGE) at each Public Access station; and
    f. One or more end use customers must commit to utilize a minimum throughput of thirty-thousand (30,000) GGE of CNG annually at each Public Access Station

(cumulatively), or one-hundred-fifty-thousand (150,000) GGE of CNG annually at each Limited Access Station (cumulatively) for each year of the 5 year contract. Under normal station operations, if the minimum throughput is not met as determined on an annual basis for each station, a "take or pay" provision that will be included by the Company in the standard CNG-1 service agreement will be applied to the CNG Retailer's invoice for EUF charges on the deficient volumes.

2. Land Lease Agreement - A property owner must agree to lease the land on which AGL will locate the CNG Equipment for a minimum five (5) year term. The property owner must also agree, at a minimum, to provide:

    a. Convenient access for customers to the fueling island(s) to utilize the CNG Fueling Infrastructure;
    b. Appropriate and timely access to the property where the CNG Equipment will be located to permit AGL employees and other authorized persons to maintain the CNG Equipment; and
    c. A safe working environment for Company employees and others while on the property.

III. CNG Equipment

There is a large range of different sizes, configurations, and costs of CNG Equipment. There are two primary types of CNG fueling, "fast fill" or "time fill", or a combination of the two. The time fill approach requires the least capital investment and is the most cost effective to operate if the vehicles to be refueled will be parked overnight at a central location. This time fill approach involves the compressor(s) delivering the gas directly to each vehicle and slowly raising the pressure over a period of time in all the vehicles simultaneously.

However, most publicly accessible CNG Stations are the fast fill configuration, by which the compressor(s) are coupled with a volume of storage to facilitate filling the vehicles in just a few

minutes through the use of differential pressure. Basically, the gas in storage is maintained at about 4,500 psig so when the fueling hose is connected to the vehicle the pressures begin to equalize and when the pressure in the vehicle storage cylinder rises to 3,600 psig the dispenser would shut off. The pressure in the storage would drop slightly and the compressor would start up to restore it to 4,500 psig over time. If too many vehicles arrive back to back then it is possible that the pressure in the storage could drop too quickly and need several hours to recover. This could cause drivers to have to wait too long to get a complete 3,600 psig fill, so it is very important to design the station with the right combination of compression and storage to match the demand profile of the vehicles.

The CNG Equipment approved under this Program is most likely to be the fast fill configuration so that the CNG fuel can be dispensed in about the same amount of time as the normal fill time for gasoline or diesel. However, the Program does not preclude a time fill CNG Station under certain circumstances as long as the station also includes at least a small amount of fast fill capability for other fleets and/or the general public to utilize. This fast fill dispenser could be installed in a "through the fence" arrangement where the third parties can drive up and refuel without actually coming onto the property.

The following information is provided for illustrative purposes so that prospective Project Applicants may have a better understanding of the components which comprise the CNG Fueling Infrastructure. It also includes the delivery capacities, capital costs, and operating costs of various nominal sizes of CNG Fueling Infrastructure. These estimates do not include any costs for land, site improvements, installation of utilities, or any other unusual conditions. These other up-front costs could vary from minimal - in the case of an existing retail fueling station simply adding a CNG dispenser - to much more significant in the case of a green field project. The estimated cost for AGL to maintain the CNG Equipment is also provided, although the actual costs will vary with throughput. The electrical costs will be even more dependent on the usage profile; a range of the anticipated annual electrical costs are included here for 20 – 80% utilization of the CNG Equipment. Please note this information is just a guide and none of the estimates or information provided herein are guaranteed to apply to any particular project. Actual operating and installation costs will vary and AGL will design and construct the actual

CNG Equipment based on the information submitted for each project, site conditions, and other factors.

Small Station				
Item Description	**Size**	**Quantity**	**Unit Price**	**Estimated Total**
Compressor Package	75 CFM	2	$70,000	$140,000
Motor Starter & Transformer		1	$7,500	$7,500
Dryer		1	$43,000	$43,000
* Dispenser	2-hose	1	$29,500	$29,500
Storage	36,000 SCF	1	$100,000	$100,000
Priority Panel (incl. w/ storage)		1		$0
* Fuel Management System		1	$13,768	$13,768
*Credit Card Access		1	$8,750	$8,750
Design & Commissioning		1	$20,000	$20,000
Installation & Permitting		1	$160,000	$160,000
Taxes			6%	$20,551
Freight				$8,000
PM & Overheads			10%	$55,107
ESTIMATED STATION TOTAL				**$606,176**

Estimated AGL maintenance cost = $25,600/yr.
Estimated Electrical Costs = $6,000 – 21,000/yr.

Medium Station				
Item Description	**Size**	**Quantity**	**Unit Price**	**Estimated Total**
Compressor Package	400 CFM	2	$200,000	$400,000
Motor Starter & Transformer		1	$25,000	$25,000
Dryer		1	$55,000	$55,000
*Dispenser	2-hose	2	$29,500	$59,000
Storage	36,000 SCF	1	$100,000	$100,000
Priority Panel (incl. w/ storage)		1		$0
*Fuel Management System		1	$13,768	$13,768
*Credit Card Access		1	$8,750	$8,750
Design & Commissioning		1	$40,000	$40,000
Installation & Permitting		1	$285,000	$285,000
Taxes			6%	$39,691
Freight				$12,000
PM & Overheads			10%	$103,821
ESTIMATED STATION TOTAL				**$1,142,030**

Estimated AGL maintenance cost = $51,200/yr.
Estimated Electrical Costs = $26,000 – 98,000/yr.

Large Station				
Item Description	**Size**	**Quantity**	**Unit Price**	**Estimated Total**
Compressor Package	500 CFM	3	$250,000	$750,000
Motor Starter & Transformer	200 hp	1	$35,000	$35,000
Dryer		1	$55,000	$55,000
* Dispenser	2-hose	2	$29,500	$59,000
Storage	36,000 SCF	1	$100,000	$100,000
Priority Panel (incl. w/ storage)		1		$0
*Fuel Management System		1	$13,768	$13,768
*Credit Card Access		1	$8,750	$8,750
Design & Commissioning		1	$40,000	$40,000
Installation & Permitting		1	$375,000	$375,000
Taxes			6%	$61,291
Freight				$20,000
PM & Overheads			10%	$151,781
ESTIMATED STATION TOTAL				**$1,669,590**

Estimated AGL maintenance cost = $87,400/yr.
Estimated Electrical Costs = $50,000 – 180,000/yr.

* Indicates components which would be installed, owned, and maintained by the Project Applicants.

IV. CNG Equipment Sizing

Project Applicants shall submit an annual CNG volume commitment for each proposed CNG Station in Gasoline Gallons Equivalent (GGE) per year meeting the minimum throughput requirements identified above in Section II. The maximum capacity of the CNG Equipment available to be installed will be calculated from the Year 1 annual commitment as follows:

1. The annual CNG volume will be converted to an average hourly delivery capacity and corresponding Standard Cubic Feet per Minute (cfm) of required compression as follows:

   Average Hourly Capacity (GGE) = Annual Commitment / 2,000 Hours per Year

   Min Compressor Capacity (cfm) = Average Hourly Capacity x 2 cfm per GGE

2. The minimum compressor cfm will then be multiplied by 5 to determine the maximum compressor cfm as follows:

   Maximum Compressor Capacity (cfm) = 5 x Min. Compressor Capacity

3. A second compressor of the same size as the Maximum Compressor Capacity will then be added to achieve 100% redundancy. In the cases of larger installations where two or more compressors are selected to meet the Maximum Compressor cfm, then just one additional compressor may be added for partial redundancy.

Project Applicants should develop their project financing and proposals in anticipation of the above station sizing methodology which will serve as the basis for determining CNG Equipment design and total cost. The total cost of the CNG Equipment will be used to determine the Cost Effectiveness Ratio (CER) in the RFP scoring process and will also be used to calculate the EUF charges on an ongoing basis. However, AGL reserves the right to modify the size of the CNG Equipment ultimately installed for an Approved Project Applicant if, in the opinion of the Company, the station capacity determined using the above methodology does not serve the public interest.

IV. RFP Process

Phase 1 of the Program will be initiated with a Request for Proposals (RFP) process as follows:

1. On or before March 1, 2012, AGL will finalize the RFP process and advertise applicable dates, guidelines and program requirements through the GPSC's website, AGL's website and statewide print media.

2. Prospective Project Applicants will have forty-five (45) days to respond to the RFP.

3. AGL shall evaluate the RFP responses and issue notices of awards within thirty (30) days and will then proceed to contract with Approved Project Applicants to have CNG Equipment installed at approved CNG Station locations.

4. Project Applicants must enter into a standard service agreement with AGL within ninety (90) days of the award notification.

5. If Project Applicants fail to fulfill their post-award obligations or to execute a standard service agreement with AGL, the award will be deemed null and void.

6. Approved Project Applicants will have thirty (30) days to address the nullification before it becomes final.

7. Once an award is nullified, the designated funds that would have been applied to the Approved Project Applicant's project will be made available to other Project Applicants.

8. Trade Secret/Confidential treatment of materials. Upon request, Project Applicants may have material submitted to the Company treated as Trade Secret or Confidential.

9. Proposals will be scored based on the following formula and component weighting:

    90% - Cost Effectiveness of Initial Throughput Commitment
    5% - Location Characteristics
    5% - Growth Potential

    Total Score = CER * Location Factor * Growth Factor

    1) Applications will first be given a Cost Effectiveness Ratio (CER) score

    Where:
    CER = Cost Effectiveness Ratio (GGE/$)

= Throughput/USF Payment

$$Throughput_{Total} = Throughput_{Year\ 1} * 1 + Throughput_{Year\ 2} * (1 - R)^1 + \ldots + Throughput_{Year\ 5} * (1 - R)^4$$

R = Annual Discount Rate

2) Next, the application will be assessed based on the following criteria for location characteristics and growth potential:

X = Location Score, $0 < X < 25$

Y = Growth Potential Score, $0 < Y < 25$

Location Characteristics	Points	Score
Strategic fit for area wide coverage and/or green corridors	0 – 5	
Proximity to interstates/major highways for ease of access, visibility, etc.	0 - 5	
Proximity to other CNG stations (farther apart is better)	0 – 5	
Operating hours for public access	0 – 5	
Security, tenant/cashier available	0 - 5	
Total	X	

Growth Potential	Points	Score
Additional fuel usage potential from anchor fleet	0 - 5	
Project Applicant's plans for promoting CNG and growing throughput	0 - 5	
Population density in surrounding area	0 - 5	

Letters of intent from other fleets in the surrounding area	0 - 5	
Proximity to other fleets in the area	0 - 5	
Total	Y	

3) Next, the total points from the Location Characteristics and Growth Potential assessments are converted to weighted factors as follows:

Location Factor = X / 500 + 0.95
Growth Factor = Y / 500 + 0.95

95% < Location Factor < 100%
95% < Growth Potential Factor < 100%

4) Then the CER, Location factor, and Growth Factor will be multiplied together to yield the Total Score.

V. Optional Considerations Regarding CNG Equipment

Project Applicants may make a voluntary CIAC payment towards the installed cost of the CNG Equipment to increase their RFP score or decrease their EUF charges, but no Project Applicant will be required to make a CIAC payment.

Approved Project Applicants shall acquire the right to execute a standard CNG Retailer agreement with the Company, and the right to purchase AGL's CNG Equipment located at the CNG Station after five years of continuous commercial operations at that location at the higher of the pro rata depreciated net book value or market value of the CNG Equipment.

The net proceeds from the sale of these utility assets will be deposited by the Company into the USF. The Company would continue to provide gas delivery service to the customer's premise through a certificated marketer under the then-applicable V-52 rate.

In addition to any other specialized requests that might be added to the standard CNG-1 service agreement, an Approved Project Applicant may negotiate with the Company to reach mutually agreeable terms and conditions for any or all of the following:

a) To consult on the design of the CNG Equipment and integration with other related components at the CNG Station; or

b) To construct the CNG Equipment; or

c) To maintain the CNG Equipment using properly qualified and trained technicians, and reduce the O&M portion of the Company's tariff rate.

VI. Phase 2 Activities

The EUF revenue collected from CNG Retailers under the CNG-1 rate will be accrued in a Reserve Account and used to fund the following three Phase 2 activities:

1. Upkeep of CNG Equipment

The CNG Equipment will not be funded through AGL's traditional rate base, so in addition to the O&M pass through component of the CNG-1 rate, sufficient additional revenues must be collected from CNG Retailers to perform future upgrades and eventually replace the components comprising the CNG Equipment.

2. Home Refueling Appliance Lease Buy-Down

Immediately upon the effective date of this final order in this proceeding, AGL will begin the process to offer a Home Refueling Appliance ("HRA") Program to homeowners and small business owners who desire to install individual vehicle fueling infrastructure at their residence or business. This will provide an opportunity for customers who might not be located close enough to the Public Access or Limited Access Stations to also have a convenient CNG fueling option. AGL will apply a portion of the proceeds from the Phase I EUF charges to offer a lease "buy-down" program so these potential customers can benefit from the Program. The Reserve Account will be utilized to cover fifty (50%) percent of the estimated cost of the lease for the first five-hundred (500) customers who sign a service agreement with the Company. This HRA lease option will be offered concurrently with Phase I of the Program.

3. Continued Funding of CNG Equipment

The USF funds authorized by the Commission for investment by the Company to install CNG Equipment will be invested under Phase I projects only. Once this initial investment has concluded, any subsequent installation of additional CNG Equipment will be funded using proceeds from the EUF charges. The process for funding additional CNG stations in Phase II will be the same as under Phase 1.

Natural Gas Vehicle Delivery Service Rate **V-52**

1. Availability

To any natural gas Customer for use as an energy source for the propulsion of motor vehicles when the natural gas is delivered by the Company into separately metered facilities which compress the natural gas (CNG) for such use, who contracts in writing for service under this schedule, provided that the Company has gas delivery capacity in excess of the then existing requirements of other Customers. The Company may establish minimum levels of annual consumption as a condition of service.

2. Rate

2.1. Delivery Rate

The delivery rate for a commercial customer which utilizes compressed natural gas to fuel motor vehicles owned or operated by the customer or sells compressed natural gas to the public shall be consistent with all applicable charges as set forth in the General Gas Delivery Service. The Customer shall pay 1/12 of the annual charges per month.

2.2 Individual Fill Unit Delivery Rate

Unless metered separately, the delivery rate for residential customers or commercial customers that install Vehicle Refueling Appliance (VRA) or Home Refueling Appliance (HRA) to fuel motor vehicles and do not resell or otherwise redeliver CNG to others shall be included in the Residential Delivery Service and/or General Gas Delivery Service rates applicable to the customer's basic gas service.

2.3. Facilities Charge

Where the Company owns and maintains facilities comprising CNG fueling infrastructure, a monthly charge of one and one-half percent (1.5%) of the gross investment of the Company in such facilities. For purposes hereof, "CNG fueling infrastructure" shall be defined in the service agreement with the Customer but shall consist, at a minimum, of a dryer, compressor(s), storage vessels, controls, cascades, piping, metering, dispensers, and other related facilities and related components..

3. Minimum Monthly Bill

The minimum monthly bill shall be the sum of 1/12 of the following charges: Annual Customer Charge, Dedicated Design Day Annual Capacity Charge, STRIDE Surcharge, Annual Peaking Service Charge and Ann ual Meter Reading Charge, and Facilities Charge (if applicable).

4. Additional Terms and Provisions

Service under this schedule is subject to the Tariff, including the Terms of Service and Rules and Regulations of the Company, as filed with and approved by the Commission from time to time, as well as all future Riders and tariff provisions made applicable to service under this schedule by the Commission from time to time, including without limitation, the Load Control Provisions.

Special Natural Gas Vehicle Delivery Service Rate **CNG-1**

1. Availability

To any Customer operating a commercial motor vehicle fueling operation that sells Gas as an energy source for the propulsion of motor vehicles through facilities owned by the Company and paid for, in whole or in part, from the universal service fund pursuant to O.C.G.A. § 46-4-161 where the Gas is first delivered by the Company into equipment to compress the Gas for the Customer, and, further, who contracts in writing for service under this schedule, provided that the Company has Gas delivery capacity in excess of the then existing requirements of other Customers. The Company may establish minimum levels of annual consumption as a condition of service.

2. Rate

2.1 Delivery Rate

The delivery rate for a commercial customer which sells compressed natural gas to fuel motor vehicles to the public shall be consistent with all applicable charges as set forth in the General Gas Delivery Service. The Customer shall pay 1/12 of the annual charges per month.

2.2 Operations and Maintenance Charge

The Company will collect an Operations and Maintenance (O&M) Charge for the use of the CNG Equipment at each CNG Station as a pass through charge. The O&M charge shall be based on estimated or actual costs for labor, recommended maintenance, repairs and the cost of electricity to operate the CNG Equipment during the upcoming period and shall be billed as a flat monthly fee, trued-up at least annually, to collect all actual expenses incurred over the previous period.

2.3 Equipment Usage Fee (EUF)

2.3.1 The EUF will be an annual fee calculated based on ten (10%) percent of the actual cost of the CNG Equipment, billed in 12 equal monthly installments, and adjusted based on the capacity utilization of each station for the current period, further adjusted to reflect the actual capital contribution invested by the Customer in the CNG Equipment

2.3.1.(i) The annual EUF for each station will be calculated as follows:

EUF = CNG Equipment Cost x 10% x UP x (1 – CIP)

CNG Equipment Cost shall be defined as the total installed cost of CNG Equipment

UP shall be defined as Utilization Percentage, determined by the average daily usage in the last meter reading cycle divided by the daily capacity of the CNG Equipment, where daily capacity is the delivery capacity over an 8 hour day.

CIP shall be defined as Customer Investment Percentage, determined by dividing the Approved Project Applicant's payment towards the CNG Equipment by the total CNG Equipment cost.

3. Minimum Monthly Bill

The minimum monthly bill shall be the sum of 1/12 of the following charges: Annual Customer Charge, Dedicated Design Day Annual Capacity Charge, STRIDE Surcharge, Annual Peaking Service Charge and Annual Meter Reading Charge, and the Equipment Usage Fee, plus the full monthly O&M Charge as determined in the service agreement.

4. Additional Terms and Provisions

Service under this schedule is subject to the Tariff, including the Terms of Service and Rules and Regulations of the Company, as filed with and approved by the Commission from time to time, as well as all future Riders and tariff provisions made applicable to service under this schedule by the Commission from time to time, including without limitation, the Load Control Provisions.

EXHIBIT __(KTV-2)

Memphis Light, Gas and Water Division

MLGW NGV Fleet

March 19, 2014

Ray A. Ward

Gas Systems Engineer, CNG Project Manager

Thinking About CNG Infrastucture Expansion?

How do you explain to your “Upper Management” and “Board” you want to spend $2 million for a large CNG station and you do not have guaranteed customers?

MLGW NGV Fleet

- 1 - 1995 GMC 1500 (in house conversions)
- 10 - 1998 GMC 1500 (in house conversions)
- 9 - 1999 GMC 1500 (in house conversions)
- 9 - 2003 Ford F150
- 3 - 2013 Ford F150 (in house conversions)
- 20 - 2012 Ford F250
- 22- 2014 Ford F250
  - Total 74

- 24 - 2014 Additions (either will be 2014 or 2015 models)
  - 9 - Ford F150
  - 10 - Ford F250
  - 4 - Ford 250 (with service bodies)
  - 1 – Ford F450

  - **Total MLGW Fleet by the end of 2014 - 98**

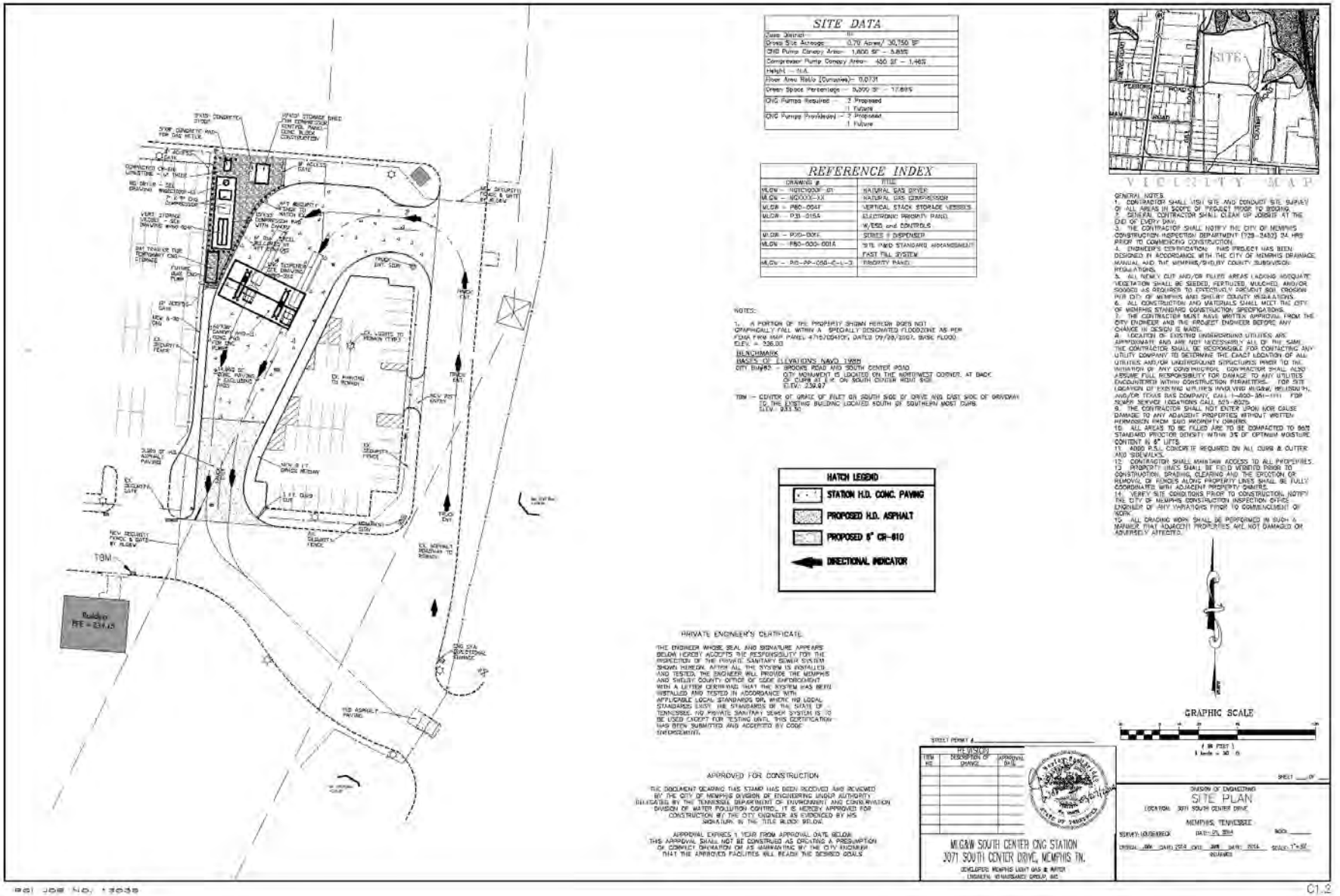
MLGW FACTOIDS

- Been using CNG since the late 70's
- Installed private CNG current station in mid 1990's
- Updated CNG station 2012 – 2013, installed new dispenser, credit card reader, more that doubled storage, removed fencing and upgraded area, replaced PLC's, added UPS
- Opened to the public July 2013
  - Dispensed 29,412 GGE of CNG in 2013 (20,462 GGE Internal)
- Station usage in February 2014
  - Total 422 Fills
    - 101 External Customers
    - 321 Internal Customers
    - 5,131.64 GGE
- City of Memphis has a new trash contractor to begin business July 1, 2014, they have ordered 23 new CNG refuse trucks
- LNG
  - Began LNG sales August 2012
  - Two Blu LNG stations to open May 2014
  - UPS will begin using LNG trucks May 2014


CLEARANCE 14'-2"
CNG
CLEARANCE 14'-2"
2
1
2
1


CNG
Fueling Station
Open July 2014
Save $2/gallon compared to diesel
MLGW
Open 24 Hours a Day • 3071 S. Center Drive

New Station Layout



The Chicken is Winning

During the first 13 days of March, the # of external customers has tripled and the CNG GGE dispensed has QUARDRUPLED!

CNG
The Right Way to Go!
For All the Right Reasons!

Questions?

EXHIBIT __(KTV-3)

Briefing Paper

Natural Gas Vehicles: What State Public Utility Commissions Should Know and Ask

Ken Costello, Principal

The National Regulatory Research Institute

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10-16

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Online Access

The reader can find this paper on the Web at:
http://www.nrri/org/pubs/gas/NRRI_natural_gas_vehicles_dec10-16.pdf.

Executive Summary

New technologies for drilling shale gas, heightened recognition of natural gas's smaller carbon footprint compared to gasoline and diesel oil, the motivation of gas utilities to increase profits through demand growth, and advances in transportation-oriented gas technology have all produced a renewed interest in natural gas vehicles (NGVs). This interest leads to the inevitable question of what role state public utility commissions and utilities should play, if any, in growing or reacting to the NGV market.

The premise of this paper is that state commissions should foster the NGV market—meaning, allow natural gas utilities or their affiliates to charge ratepayers for investing in and operating infrastructure necessary for NGVs—if and when they determine that this action would coincide with the public interest. This determination might require state commissions to examine whether such an action advances important regulatory objectives while not impeding others. These objectives can include environmental and other positive social gains that do not directly benefit NGV users.

If state commissions deem NGVs to be in the public interest, they should then determine: (a) whether existing rules and regulations hinder the development of NGVs, (b) the most effective actions to take in removing uneconomical barriers, (c) whether, to what extent, and how utilities should pursue the development of NGVs, (d) whether gas utilities should provide NGV-related services as a core function or through an unregulated affiliate—or not at all, leaving these activities to non-utility players, and (e) the effect of utilities' NGV activities on customers and other regulatory objectives (e.g., cost-of-service rates, fair competition).

This paper has two major purposes. The first is to educate commissions on the status of, and prospects for, NGVs. Compared to vehicles using other forms of energy, NGVs have both favorable and unfavorable features. The appendix highlights the assessments of outside experts on the outlook for NGVs. The consensus is that NGVs and electric vehicles can coexist to displace a portion of the market for conventional vehicles in urban fleets. The most promising markets for NGVs, based on the latest evidence, are commercial and government fleets. Specifically, NGVs' best bet is high-mileage urban (light and heavy) fleets with central refueling.

The second purpose of this paper is to (a) describe the possible roles that state commissions and local gas utilities might play in NGV development, and (b) identify issues that state commissions should address and questions they should ask.

Gas utilities can assume different roles in the NGV market. At one pole they can confine their activities to the provision, under existing regulatory rules, of local gas transportation service: (1) public and private refueling stations and (2) homes with a refueling appliance. In this minimalist role, utilities provide no marketing or promotion of NGVs. They merely provide a natural-monopoly service (e.g., local transportation) at a regulated price. They might also provide city-gate service—for example, the interstate delivery of natural gas to the utility's distribution system. Overall, gas utilities would simply react to the demand for NGVs and not try to affect the NGV market itself.

In a more active role, gas utilities would engage in marketing and promoting NGVs. They might attempt to educate customers on the benefits of NGVs and purchase NGVs for their own fleets. Education and outreach are particularly critical for a technology like NGVs that are largely unknown to the general public. This role might also include advocating for governmental financial incentives at the federal, state, and local levels.

Gas utilities might also provide ratepayer-funded financial incentives for the purchase of home fueling appliances, offer price discounts to customers who have NGVs, and provide financial support for the development of central refueling stations. All of these activities attempt to bolster or "jump-start" the market for NGVs. This paper discusses the fundamental question of whether, and under what conditions, the utility should "charge" all customers for a service that would directly benefit only a distinct minority. One essential condition for such a role is that the gap between the social benefits of NGVs and the private benefits to vehicle owners is large enough to justify a general ratepayer-funded subsidy.

State commissions can influence the development of NGVs. Through their policies, commissions can affect the scope of a utility's NGV-related services, in addition to the utility's incentive to provide those services. In determining cost recovery and the speed of optimal market penetration, commissions should evaluate the merits of new and underdeveloped technologies like NGVs on the basis of their effects on consumers. They will need to:

1. Measure the risks to consumers and utility shareholders,

2. Determine how different cost-recovery mechanisms would affect the utility's financial condition and the risks to consumers,

3. Identify and measure the benefits and costs of new and underdeveloped technologies,

4. Determine the proper market structure for deploying the technology, and

5. Determine the effects of consumer education on the market penetration of new demand-side technologies, such as NGVs.

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Natural Gas Vehicles: What State Public Utility Commissions Should Know and Ask

The optimistic outlook for natural gas in the United States has heightened interest in growing the use of this source of energy in various sectors including transportation.[1] Concerns over our dependency on oil imports and greenhouse gas have elevated the urgency of finding alternatives to petroleum-based vehicles. These alternatives, referred to as alternate fuel vehicles (AFVs), include natural gas vehicles (NGVs), biodiesel, and electric vehicles.[2] They offer our country hope for increased energy independence and a cleaner environment.[3]

The extent to which AFVs will penetrate the transportation market and the contributions of each type hinge on economic, technical, environmental, political, and regulatory factors. A major factor is consumer acceptance of non-petroleum vehicles over petroleum vehicles, which have long dominated the U.S. transportation market.

This paper focuses on NGVs.[4] Fueling sources for NGVs can include compressed natural gas (CNG), liquid natural gas (LNG), or biomethane. CNG allows gas to be stored in a safe and secure cylinder within the vehicle. LNG has the advantage of requiring only 30 percent of the space that CNG needs to store the same amount of energy. The lower space requirement is especially beneficial for heavy-duty trucks traveling long distances. Recoverable from landfills, wastewater, and dairy farms, biomethane emits less pollution than other sources of gas.

This paper has two major purposes. The first is to educate state public utility commissions ("state commissions" or "PUCs") on the status of, and prospects for, NGVs. Compared to vehicles using other forms of energy, NGVs have both favorable and unfavorable features. The appendix highlights the assessments of outside experts on the outlook for NGVs.

The second purpose of this paper is to (1) describe the possible roles that state commissions and local gas utilities might play in NGV development; and (2) identify issues that commissions should address and questions they should ask.

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[1] *See*, for example, U.S. Department of Energy and National Energy Technology Laboratory, *Modern Gas Shale Development in the United States: A Primer*, April 2009; and U.S. Energy Information Administration, *Annual Energy Outlook 2010*, May 2010.

[2] For comprehensive information on AFVs, including state/federal financial incentives and detailed information on each type of AFV, *see* DOE AFV Data.

[3] Natural gas is the cleanest of the fossil fuels and a source of energy that is about 98 percent produced domestically (excluding Canadian imports). NGVs emit about 25 percent less carbon dioxide than comparable gasoline- or diesel-fuel vehicles and produce about 80 percent fewer ozone-forming emissions.

[4] NRRI conducted a comprehensive study on NGVs back in 1992. *See* Daniel J. Duann and Youssef Hegazy, *Natural Gas Vehicles and the Role of State Public Service Commissions*, NRRI 92-8 (Columbus, OH: National Regulatory Research Institute, 1992).

I. Utility Involvement in the NGV Market

A. Utilities can assume a wide range of roles

The development of NGVs offers gas utilities an opportunity to increase their profits. At the least, NGVs would increase throughput on the distribution system, which is the major source of profits for gas utilities.[5] In contrast, increases in natural gas demands by the electric power producers would benefit gas utilities less because many, if not most, gas-fired generating facilities bypass the local gas utility system.[6]

Gas utilities can assume different roles in the NGV market. At one pole they can confine their activities to the provision of distribution service under existing regulatory rules to (1) public and private refueling stations and (2) homes with a refueling appliance.[7] In this minimalist role, utilities provide no marketing or promotion of NGVs. They merely provide a natural-monopoly service (e.g., local transportation) at a regulated price.[8] They might also provide city-gate service—for example, the interstate delivery of natural gas to the utility's distribution system.[9] Overall, gas utilities would simply react to the demand for NGVs and not try to affect the NGV market itself.

In a more active role, gas utilities would engage in marketing and promoting NGVs. They might attempt to educate customers on the benefits of NGVs and purchase NGVs for their own fleets. Education and outreach are particularly critical for a technology that, like NGVs, is largely unknown to the general public.[10] This role might also include advocating for governmental financial incentives at the federal, state, and local levels.

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[5] This new throughput might require new investments that utilities can include in rate base and make a return. In a revenue-decoupling world, utilities' profits could increase less or not at all in the short term.

[6] Bypass occurs when a new or existing consumer takes natural gas off the interstate or intrastate pipeline system. These consumers, therefore, require no or minimal services from the local utility.

[7] Distribution service include transportation from the city gate to the customer's premises as well as backup, storage, and load balancing provided to transportation customers.

[8] One issue is the price they should charge. The utility might justify lower rates to homes with a refueling appliance on the basis that these customers would have a higher load factor than other residential customers.

[9] This situation would occur when the customer has to buy the natural gas itself from the local gas utility. As an example, a residential customer who refuels her NGV at home might not have the right to purchase natural gas from sellers other than the local utility.

[10] Evidence has shown that consumers tend to be myopic in not accounting for the life-cycle benefits of durable goods like motor vehicles. Such shortsightedness, caused by such factors as uncertainty about the future and imperfect information, might warrant government or utility intervention. It might include better consumer education and financial incentives.

Gas utilities might also provide ratepayer-funded financial incentives for the purchase of home fueling appliances, offer price discounts to customers who have NGVs, and provide financial support for the development of central refueling stations. All of these activities attempt to bolster or "jump-start" the market for NGVs. Part III.A of this paper discusses the fundamental question of whether, and under what conditions, a utility should "charge" all customers for a service that would directly benefit only a distinct minority. One essential condition is that the gap between the social benefits of NGVs and the private benefits is large enough to justify a subsidy.

In sum, gas utilities can assume different roles. They range from a minimalist role to a more active role in which utilities attempt to act as a catalyst for market activities. The latter function might include managing and funding an upgraded infrastructure (e.g., refueling stations) that would simulate the market for NGVs. It might also involve promotional activities that subsidize consumers for NGV-related services that utilities provide.[11] An important question is: If utilities, with approval from their commission, engage in active promotion of NGVs with financial assistance from ratepayers, how long should they be able to carry out this activity? If "jump-starting" the NGV market is the rationale for promotion (e.g., giving financial assistance to NGV owners), good commission policy would limit both the money spent and the duration of such activities.

B. Specific utility functions

Possible utility functions are as follows:

1. *Selling of distribution service:* The utility would deliver natural gas owned by a third party from the city gate to the party's refueling station at low pressure; the station would then compress the gas and dispense it at high pressure into NGVs.

2. *Selling of bundled sales service:* The utility would sell the commodity natural gas, and interstate and local transportation to third-party refueling stations.

Incidentally, benefits-myopic consumers are a major rationale for utility activities promoting energy efficiency.

[11] Questar in Utah has taken a more active role than other gas distributors in the development of NGVs. It has, among other things, (1) assisted fleet operators and others in the building and operation of refueling stations, (2) worked with state and local governments to promote NGVs, and (3) helped to assure adequate utility system requirements to accommodate growing demand for NGVs. Questar's service territory has more than one hundred refueling stations, some of them owned and operated by the utility. Utah has seen a large number of used NGVs imported from other areas of the country. See *American Gas*, "Full Speed Ahead," April 2010: 22-26, at Full Speed Ahead.

3. *Selling of bundled sales service plus "fueling" service:*[12] Besides providing delivery and commodity gas, the utility would own refueling stations in which it would compress the gas and dispense it for vehicle use.

4. *Selling or leasing of home refueling appliances:* The utility would own these appliances and rate base them or lease them to customers who own NGVs.[13]

5. *Dissemination of information on NGVs:* The utility would educate customers on the benefits of NGVs and the availability of government financial incentives.

6. *Marketing of NGVs through promotional and other practices:* The utility would offer discounted rates for NGV-related services and provide financial and other assistance to refueling stations or other entities involved with NGVs.[14]

7. *Research and development (R&D) activities and funding:* The utility would perform the R&D itself or, more likely, contribute funds to other organizations for R&D activities that, among other things, would improve the economics and consumer acceptability of NGVs.[15]

8. *Expansion of infrastructure to accommodate NGVs:* The utility might have to expand its facilities to accommodate NGVs.[16] One possible expansion would be an increase in the number of distribution lines to refueling stations. A utility might also partner with other entities to develop the necessary infrastructure.[17]

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[12] Although gas utilities might have the capability to provide services, such as vehicle repair and maintenance, conversion of vehicles to NGVs, and equipment sales, the author assumes that they are unlikely to do so.

[13] By leasing home refueling appliances, the household would not have to make substantial investments in purchasing, installing, and maintaining the appliances. Third-party financing might help to alleviate this problem.

[14] Discounted rates reflect value-of-service rates that account for the demand characteristics of customers. These rates are discriminatory in that the utility charges different rates to customers in the same class (as long as they fall within the zone of allowable rates). Discounted rates raise the issue of who should bear the cost of discounts (i.e., revenue shortfalls from fully allocated cost revenues)—utility customers, utility shareholders, or both groups sharing the costs.

[15] A major issue revolves around who should fund R&D activities—utility customers, utility shareholders, or both groups sharing the costs.

[16] As with the previous two roles, a major policy issue is who should bear the costs—utility customers, utility shareholders, or both groups.

[17] On September 7, 2010 Atlanta Gas Light (AGL) filed a proposal with the Georgia Public Service Commission to build refueling stations for the purpose of encouraging public and private fleets to purchase NGVs. As expressed in its filing, AGL hopes to "seed the market." The utility sees the lack of refueling stations as the primary barrier to the development of NGVs.

C. Market structures for different NGV-related functions

Market structure refers to the number and concentration of sellers and buyers that consummate trades for specific goods or services and entry conditions affecting those sellers and buyers. The three broad descriptions of market structure are competitive, oligopolistic, and monopolistic. When a market has several actual or potential buyers and sellers, with minimal entry and exit barriers, analysts consider it competitive. In competitive markets, individual firms have no effect on market prices. Oligopolistic markets have few sellers, with each firm having some influence over price. Monopolistic markets have one seller and severe entry barriers. As a rule, if a market is effectively competitive[18] or even oligopolistic,[19] the best results happen with no price regulation. Some markets in their nascent stage lack competitive features, but at a later time acquire them through technological changes, fewer entry barriers, and better-informed consumers.

The previous discussion on possible functions that utilities can perform in the NGV market leads to the policy question of whether non-utility entities can perform them feasibly and economically. If transactions for a specific service, for example, can consummate in a competitive market, the commission should then eliminate any entry barriers that might stifle competition. In this instance, the utility should not have a monopoly in that market and participate as a regulated entity; the commission might also decide not to allow the utility's unregulated affiliate to participate in that market as well.[20] At the other end of the spectrum, if

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The utility proposes to work with fleet operators and local governments to construct central refueling stations. It also proposes to work with fleet operators and CNG retailers to encourage market participation. (*See* Docket 32499)

[18] An effectively competitive market would have a number of features, including (a) consumers have real choices for goods and services, (b) consumers receive proper price signals, (c) individual suppliers are unable to control prices, and (d) no individual firm has an unfair advantage over other firms.

[19] Analysis of oligopoly markets lacks a unifying theory in producing precise, useful results relating market structure to conduct and performance. Oligopoly theory, for example, does not offer any definite price predictions analogous to the predictions of perfectly competitive and monopoly markets. Most theories that are applied predict that prices in oligopoly markets are greater than marginal cost but less than the price of a pure monopolist. Various oligopoly models predict different outcomes because of their varying assumptions about how firms behave, the number of firms in a relevant market, the characteristics of a market and the products sold, and the degree of interaction between firms. *See*, for example, Luis M.B. Cabral, *Introduction to Industrial Organization* (Cambridge, MA: The MIT Press, 2000), 99-126.

[20] Several sources can account for problems from a utility-affiliate relationship: the pricing of utility-affiliate transactions, cost shifting, cross-subsidization, discriminatory regulated service from "essential facilities," mandatory tying of "essential facilities" service and unregulated service, and discriminatory release of information from a utility to unregulated entities.

the most efficient market structure for a service (e.g., gas distribution) is a natural monopoly, then having the local gas utility as the sole provider makes economic sense. [21]

Table 1 lists the different NGV-market functions and the possible entities that can perform those functions. Although the local gas utility can perform all of the functions listed, other parties can perform most of them as well. The table suggests that third parties can assume several functions in the NGV market, with the utility role limited to providing only the natural-monopoly service, local distribution. The burden, therefore, lies with the utility to show that it should perform a number of functions that other entities presumably can perform. Whether third parties would perform these functions in a competitive environment is a legitimate question that commissions would need to ask. Especially in an underdeveloped market such as that for NGVs, competition might be difficult to achieve initially.

As one illustration, refueling stations do not have the characteristics of a natural monopoly. A market should be able economically to sustain several refueling stations; but this premise assumes a developed market with a large number of NGVs. At the initial stages, however, the number of NGVs might be too small to sustain more than a few refueling stations. Without a regulated utility-owned refueling station, these few stations can exercise market price by charging excessive prices (assuming that they are not subject to price regulation). Thus, a regulated utility-owned refueling station can constrain the price charged by other stations. On the other hand, utility presence in the refueling station can discourage the entry of third-party stations. The utility might have cost advantages because of economies of scale or scope or other advantages that could act as a barrier to the entry of third-party entities. A policy question then becomes: How can a state commission create a "level playing field" between utility-owned and third-party refueling stations?

[21] According to one definition of a natural monopoly, if total production costs rise when two or more firms produce instead of one, the single firm in a market is called a "natural monopoly."

II. Essential Information for Commissions

In making good decisions about the utility's proper role in the NGV market, commissions should have certain information, which includes:

Barriers to NGV development

1. Regulatory barriers to the development of NGVs

2. Market barriers to the development of NGVs

3. Market barriers that represent market failures or distortions that might justify government or utility intervention (e.g., financial incentives)[22]

4. Different regulatory, utility, and other actions that address individual regulatory and market barriers and their associated costs

Economics of NGVs

1. The conditions (e.g., technological advancements, low natural gas prices) required for the economic attractiveness of NGVs compared to other AFVs and petroleum vehicles[23]

2. Reasons for the current low penetration rate of NGVs in the U.S.[24]

3. The effect of government financial incentives to "jump-start" the NGV market

4. The proper market structure for refueling and other NGV-related services,[25] with the follow-up question of what role utilities can play in providing those services

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[22] Market failures are those barriers to NGV development that prevent vehicle consumers from making rational and socially desirable decisions. They might stem from third-party environmental and national security benefits, as well as the lack of unbiased information on the economics of NGVs compared to other kinds of vehicles.

[23] What, for example, would trigger the public to purchase NGVs over petroleum vehicles and other AFVs?

[24] The low penetration of NGVs might be a rational response of the market to the unattractive economics and other negative features of NGVs compared to other kinds of vehicles. It might reflect, however, a serious market problem in which vehicles drivers are underestimating the private benefits of NGVs or overestimating the costs.

[25] Are refueling stations, for example, natural monopolies or can they operate in a competitive environment? It is reasonable to conclude that refueling stations could operate in a competitive environment assuming a developed NGV market, similar to retail gasoline stations, in the absence of evidence showing significant economies of scale or scope to justify a regulated monopoly. Refueling stations can be either limited-access or public. Limited-access stations

Social benefits of NGVs

1. The environmental and other social benefits of NGVs[26]

2. The social desirability and competitiveness of NGVs compared to electric vehicles

3. The social desirability of a higher penetration of NGVs, along with the most efficient and effective ways to achieve a higher level if found justified

State experiences with NGVs

1. Examples of successes in states that have promoted NGVs

2. Examples of failures in states that have promoted NGVs

Utility role in providing NGV-related services

1. Possible utility roles and the rationale underlying each one

2. Requisite conditions for utility provision of NGV-related services

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offer service only to specific fleets (e.g., city buses, an airport shuttle company). Fleet owners build and operate their own refueling stations to ensure that their vehicles receive fuel when needed. The utility or a third party alone can own and operate them, or they can form a partnership, say, with an oil company.

[26] If these social benefits are substantial, as a policy matter NGV development then should become the purview of the government's energy and environment policies, rather than just a gas utility and commission matter.

III. Using the Information to Reach Commission Decisions

A. Four questions for commissions to ask

State commissions can influence the development of NGVs. Through their policies, commissions can affect the scope of a utility's NGV-related services, in addition to the utility's incentive to provide those services.

In determining cost recovery and the scope of utility involvement, commissions should evaluate the merits of new and underdeveloped technologies like NGVs on the basis of their effects on consumers.[27] They will need to: (a) measure the risks to consumers and utility shareholders, (b) determine how different cost-recovery mechanisms would affect the utility's financial condition and the risks to consumers, (c) conceptualize and measure the benefits and costs of new and underdeveloped technologies, (d) determine the proper market structure for deploying the technology,[28] and (e) determine the effects of consumer education on the market penetration of new demand-side technologies, such as NGVs.

When social benefits from a technology extend beyond those received directly by direct beneficiaries (i.e., social benefits exceed private benefits), commissions might find it appropriate to spread the costs to all customers. Assume that the benefits from NGVs include a cleaner environment for everyone and less dependency on foreign oil. Commissions might approve the recovery from all utility customers of costs associated with promoting NGVs and investing in additional infrastructure. On the other hand, if the utility and NGV customers alone stand to benefit from NGVs, the risks of utility actions should not fall on the general ratepayer.[29] In this instance, a policy of balancing the risks and benefits would require the shareholders and NGV customers to shoulder the entirety of the risks.[30]

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[27] New technologies or underdeveloped technologies like NGVs frequently have potentially high but uncertain benefits to consumers and society.

[28] Would, for example, some NGV-related services be more efficiently provided in an unregulated market or in regulated markets with natural-monopoly features?

[29] Sometimes in other contexts, analysts refer to this outcome as "socializing the risks, but privatizing the benefits."

[30] A utility, for example, might invest in new distribution mains in anticipation of demand growth in NGVs. Compared to other situations, this expectation involves a demand-side technology with a high degree of uncertainty as to its market penetration. Funding this investment from all ratepayers would, therefore, impose an excessive risk upon them.

Table 1: Possible Entities Performing NGV-Market Functions

NGV-Market Function	Possible Providers
Selling of distribution service	▪ **Local gas utility**
Selling of bundled sales service	▪ **Local gas utility** ▪ **Third-party marketers (interstate transportation and commodity natural gas)**
Selling of bundled sales service plus "fueling" service	▪ **Local gas utility** ▪ **Third-party marketers (interstate transportation and commodity natural gas)** ▪ **Third parties (refueling stations)**
Selling or leasing of home refueling appliances	▪ **Local gas utility** ▪ **Third parties (manufacturers, wholesale and retail outlets)**
Dissemination of information on NGVs	▪ **Local gas utility** ▪ **Third parties (auto manufacturers, state or federal agencies, natural gas organizations)**
Marketing of NGVs through promotional and other practices	▪ **Local gas utility** ▪ **Third parties (auto manufacturers, refueling stations, gas marketers)**
R&D activities and funding	▪ **Local gas utility** ▪ **Third parties (auto manufacturers, natural gas organizations)**
Expansion of infrastructure to accommodate NGVs	▪ **Local gas utility (distribution, storage, refueling stations)** ▪ **Third parties (refueling stations)**

Commissions should ask themselves four broad questions. The first pertains to the public-interest aspects of NGVs.[31] Commissions make decisions that serve the general public,

[31] Commissions might define the "public interest" by identifying the multiple objectives that comprise the public interest, assigning weights to those objectives, and resolving the trade-offs among them. The objectives of an NGV policy might include increased utility throughput and profits, fairness to all customers, efficient pricing of NGV-related services, promotion of competition in the refueling market, a cleaner environment, less dependency on foreign oil, and direct customer benefits from driving an NGV. What commission policy evolves implicitly depends on the relative importance of the objectives and the tradeoffs made. If, for example, a

which might conflict with the interests of individual groups. More utility involvement in promoting NGVs might be good for a utility's shareholders, but bad for customers who fund this promotion but receive no benefits.

The public interest might coincide with a commission policy of encouraging those AFVs that are most economical and socially beneficial, which might not include NGVs. The commission's goal should be to approve those AFV-related expenses and investments that maximize net social benefits, encompassing both fewer air pollutants and improved national security. Greater interest so far lies with electric vehicles than with NGVs. It is unclear at this time whether electric vehicles will turn out to be more economical and socially beneficial than NGVs.[32] Both of these vehicles have promise, but each must overcome major barriers to succeed. Electric vehicles, for example, are expensive relative to petroleum vehicles and NGVs, all-electric cars have less range then other vehicles, customer acceptance is uncertain, and home-based charging stations are costly.

Second, commissions need to ask themselves what is the most appropriate role for utilities in the development of NGVs. Part I.B discusses several roles that utilities can play. Commissions might find preferable utilities' acting only as distributors of natural gas to refueling stations. They might conclude that gas utilities' core function is distribution and that they lack any special business acumen in other functions of the NGV market. In other words, the commission, in addition to determining that distribution has the features of a natural monopoly, might view other NGV-related services as competitive in nature.

Third, commissions should comprehend consumer behavior when it comes to selecting vehicles that have different energy sources. They should, for example, understand the major

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commission assigns a high weight to a cleaner environment, it would tend to spread NGV-related costs to all utility customers, even to those that do not directly benefit from NGVs. On the other hand, if the commission views the benefits as going exclusively to the utility and NGV drivers, it would tend to support a policy that allocates costs only to the utility shareholders or NGV drivers without imposing any direct costs on the general ratepayer.

[32] One study has shown that the life-cycle cost (i.e., the sum of ownership and operating costs) of a Chevy Volt, which is an electric plug-in vehicle introduced to the U.S. market in late 2010, is almost 40 percent higher than the cost of a comparable NGV (Civic GX). Although the Chevy Volt has a lower operating cost, its purchase price is much higher.

The study concluded that:

> Because the incremental cost of owning an EV [electric vehicle] exceeds that of owning an NGV, NGVs are in fact under many scenarios presently more cost effective at reducing greenhouse gases compared to EVs, even though EVs may produce fewer emissions overall. This advantage becomes larger in regions with intensive coal generation or significantly lower natural gas prices. Our analysis shows that unless the purchase price of EVs can be reduced significantly in the short to medium term, *it is likely that NGVs will remain a more cost-effective choice in reducing greenhouse gas emissions*. (Emphasis added) (*See* London Economics Study, at 1.)

factors (e.g., utility promotion, government financial incentives, life-cycle costs, initial vehicle cost) and their relative importance in increasing the penetration of NGVs. With access to this information, commissions can better evaluate the efficacy of a utility's proposal to promote NGVs. As an illustration, if a utility wants ratepayers to fund additional refueling stations and new distribution lines, the commission should know the extent to which these investments will actually increase the number of NGVs. Investments might add little to develop the NGV market if other factors, like the high initial cost of an NGV or the cost of conversions, mostly explain the low use of NGVs.[33] The reader should know that the optimistic outlook for NGVs in the 1990s never transpired. The Energy Policy Act of 1992 (EPAct of 1992) lifted regulatory impediments to NGVs development and also provided financial incentives.[34] Notwithstanding this favorable legislation, in addition to low natural gas prices throughout most of the 1990s, the promising future for NGVs never came to fruition. Commissions should ask themselves: Will history repeat itself?

The fourth question relates to commission policy on ratemaking and the appropriate role of gas utilities in promoting NGVs. Under what conditions should commissions care about a utility's actions in promoting NGVs? Should commissions allow a utility to own and operate refueling stations?

B. Areas of commission inquiry

If commissions deem NGVs to be in the public interest, they should then determine:

1. Whether existing rules and regulations hinder the development of NGVs,

2. The most effective actions to take in removing uneconomical barriers,

3. Whether, to what extent, and how utilities should pursue the development of NGVs,

4. Whether gas utilities should provide NGV-related services as a core function or through an unregulated affiliate, and

5. The effect of utilities' NGV activities on customers and other regulatory objectives (e.g., cost-of-service rates, fair competition).

Concerning uneconomical barriers, appropriate responses might range from doing nothing and providing consumer education to compensating for the barriers by offering

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[33] Another factor might be the low number of available NGVs for prospective drivers. The high cost of modifying petroleum vehicles to use natural gas might continue to be a problem in limiting the availability of NGVs.

[34] *See* Kenneth W. Costello et al., *A Synopsis of the Energy Policy Act of 1992: New Tasks for State Public Utility Commissions* (Columbus, OH: National Regulatory Research Institute, June 1993), at 59-62. The legislation recognized several impediments to NGV development, including state price regulation of refueling stations and other forms of regulation, lack of public information on NGVs, the high cost of NGVs, and the deficiency of refueling stations. One reason for the disappointing outcome was that the federal government decided not to mandate the purchase of AFVs by local governments and private fleets.

prospective NGV drivers financial incentives. Doing nothing is justified when the barriers do not produce large enough inefficiencies to offset the cost of intervention. An analogous situation exists when the government tries to intervene in markets with minor problems. Government policies frequently cause counterproductive results or mitigate a problem at a higher cost than necessary.[35] As an illustration, a commission might want to bolster the NGV market by allowing a utility to offer below-cost leasing rates for home refueling appliances. The aggregate cost of the subsidized rates to customers as a whole might exceed any benefits that arise out of this rate policy. On the other hand, doing nothing might produce inferior market performance when serious market problems exist. If, for example, there is little information on the benefits of NGVs over petroleum vehicles, car buyers could make uneconomical decisions.

State commissions must recognize the important role that they can play in developing the market for NGVs. The extent to which NGVs penetrate the market will depend mostly on economic factors, [36] federal and state environmental and energy policies, technological advancements, and the success of other AFVs. At the least, state commissions should attempt to remove those barriers that would impede the socially desirable development of NGVs. They need to walk a tightrope, however, between encouraging promotion that is excessively costly and risky to ratepayers and standing in the way of justifiable NGV development.

C. Ratemaking criteria

A major task of commissions is to ensure "just and reasonable" rates for services that they have determined the utility should perform. In the context of NGVs, such rates should have the following features:

1. *They reflect the costs of an efficient or prudent utility*. Assume that NGVs require the utility to expand its infrastructure to accommodate NGVs or spend money on educating customers. Commissions should determine that these costs are not excessive before allowing utility recovery. Excessive costs are more likely when the

[35] *See*, for example, Clifford Winston, *Government Failure versus Market Failure: Microeconomics Policy Research and Government Performance* (Washington, D.C.: AEI-Brookings Joint Center for Regulatory Studies, 2006); and Charles Wolf, Jr., "A Theory of Nonmarket Failure: Framework for Implementation Analysis," *Journal of Law and Economics*, Vol. 22, no.1 (April 1979): 107-39.

[36] Economic factors affect the life-cycle cost of vehicles. The relevant cost is the annual cost of owning, operating, and maintaining vehicles. Cost depends, therefore, on the purchase price of a vehicle, the miles traveled, fuel cost and efficiency, and maintenance cost. Compared to petroleum vehicles, NGVs are more expensive to purchase but cheaper to operate and maintain. In purchasing an NGV, consumers must trade off the higher initial cost for cost savings over time. The same tradeoff exists when prospective consumers are contemplating whether to purchase an electric vehicle or NGV. Electric cars have a higher purchase price than comparable NGVs but lower operating costs. Similarly to energy efficiency in the home, consumers might undervalue energy-cost savings and focus on the initial cost, resulting in uneconomical decisions and overestimation of the payback period. Uncertainty over the operating performance of NGVs and the availability of refueling stations might also discourage the purchase of NGVs.

ratepayers, rather than the utility's shareholders, bear the risks of bad investments and other imprudent utility activities.

2. *They reflect the cost of serving different customer classes and of providing different services.* Deviations from this principle of ratemaking require that commissions articulate the advancement of a specific public-policy or ratemaking objective. Assume, for example, that a commission believes that NGVs should be an integral part of a state energy policy and have observable environmental and national security benefits. It can then justify approving below-cost rates or subsidies that would "jump-start" the market for NGVs. In this instance, price discrimination advances some articulated social objective that the commission deemed would offset the inefficiencies from subsidies or non-cost rates. If utilities want to use ratepayer money to promote NGVs, they should have the burden of proof to demonstrate public benefits or future benefits to funding ratepayers.[37] But even if utilities can show public benefits, an equity problem arises from non-ratepayers' receiving a portion of these benefits without contributing any funds (i.e., being "free riders").

3. *They allow the efficient or prudent utility a reasonable opportunity to earn a rate of return commensurate with its cost of capital.* "Just and reasonable" rates entail commissions' allowing a utility a reasonable opportunity to earn its authorized rate of return when it acts prudently and efficiently. Assume that a utility makes capital investments to expand its distribution system or storage facilities to accommodate NGVs. If the commission previously approved these investments and determined that the utility managed them prudently, it should then allow the utility to earn an adequate rate of return on those investments.

4. *They should reflect fair treatment of the utility's customers and shareholders.* The term "fair" has different meanings. It refers to the treatment of different customers and classes of customers, as well as the utility's shareholders. One interpretation is that a commission's decision determining rates for NGV-related services should not be "arbitrary or capricious." Another is that funding for the development of the utility's infrastructure to accommodate NGVs or spending money in promoting NGVs should balance the risks and benefits. Risk allocation pertains to both the risks among different customers and the risk to customers as a group and the utility's shareholders. Assume that the shareholders and owners of NGVs are the sole beneficiaries of promotional activities. Good regulatory policy dictates that the general ratepayer is held harmless from utility activities to invest and spend other money on accommodating and promoting NGVs.

[37] Third-party or external benefits exist when the pricing mechanism fails to include the social costs from imported oil. These costs include threats to national security and the higher pollutant levels emitted from petroleum vehicles.

D. Specific questions on cost recovery and NGV development

Development and promotion

1. Should commissions develop a policy toward NGVs? If they do, what elements should a policy include (e.g., a specified cost-benefit test, the role of utility affiliates, criteria for cost recovery and pricing)?

2. When are NGVs in the public interest? How can utilities demonstrate this condition to commissions (e.g., that the social benefits of NGVs exceed the social costs)?

3. What role should commissions play in overseeing and approving a utility's plan or strategy for NGVs? Should utilities consider NGVs as part of the integrated resource planning (IRP) process?[38]

4. What role should utilities play in promoting NGVs (e.g., marketing, rate incentives, education,[39] shareholder-funded investments in refueling stations; working and partnering with potential fleet customers, manufacturers of NGVs, and fueling equipment providers)? What are the criteria for utilities to assume a specific role?

5. What role should utilities play in the installation of home refueling appliances?

6. Are refueling stations public utilities with natural-monopoly characteristics? How can commissions know when the refueling business is "workably competitive"?

7. How can a commission create a "level playing field" between utility-owned and third-party refueling stations?[40]

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[38] If commissions do, they might ask: How can utilities justify the development of NGVs when their plan includes energy-efficiency initiatives and pricing that encourage less natural gas consumption? One answer is that residential and other existing customers might be consuming natural gas beyond the level that is socially optimal (e.g., they underestimate the present value benefits from energy efficiency), while gas consumption for NGVs is below the optimal level (e.g., existing drivers of gasoline vehicles should switch to AFVs such as NGVs because they do not account for the higher environmental and "national security" costs of gasoline vehicles).

[39] Whether the gas utility should disseminate information on the merits of NGVs depends on its incentive to distribute unbiased information. Instead, it might be preferable to have the regulator or the state energy office, if they deem the growth of NGVs to be in the public interest, disseminate this information. On the other hand, if commissions found it appropriate for utilities to promote NGVs, disseminating information might be an integral part of that activity.

[40] This question presumes that, especially in a nascent NGV market, the preferred policy is to allow the coexistence of utility-owned and third-party refueling stations. An "uneven playing field" in favor of the utility can discourage entry by third parties and forestall the time that refueling stations could compete with each other.

8. What role should gas utilities play in the refueling function (e.g., deliver gas to a refueling station owned by a third party or to a self-owned refueling station; utility partnership with gasoline service-station owners)? When should utilities leave the NGV refueling business?[41] Would the NGV market develop more quickly and competitively without gas utilities' owning refueling stations?[42]

9. Under what conditions should commissions allow a utility affiliate to provide refueling and other NGV-related services? What general policy should commissions have toward diversification by the utility's parent company or the utility itself into the NGV market?[43]

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[41] A legal question is: Does state law grant a commission authority over the resale of natural gas (e.g., by a third-party operator of a refueling station)? If so, then the follow-up question is whether federal law preempts state law. Some commissions have ruled that the EPAct of 1992 preempts state law in the sale of natural gas for use as a vehicle fuel unless a contrary state provision was in place. Specifically, EPAct of 1992 stipulates that the transportation or sale of natural gas for use in NGVs by any entity not otherwise a public utility shall not be considered a transportation or sale of natural gas within the meaning of any state law and regulation in effect before January 1, 1989. (*See* Kenneth W. Costello et al., *A Synopsis of the Energy Policy Act of 1992: New Tasks for State Public Utility Commissions* (Columbus, OH: National Regulatory Research Institute, June 1993), at 59.

In Idaho, the Public Utilities Commission ruled that the term "public utility" includes those persons or entities who "in turn deliver or resell a utility commodity (e.g., natural gas) to the public or some portion thereof for compensation." The commission, however, ruled that EPAct of 1992 gave the federal government supremacy over state law with regard to the resale of natural gas for vehicles. (*See* Idaho Decision) The California Public Utilities Commission, as another example, has ruled that persons operating service stations that resell compressed natural gas for vehicular use, other than public utilities, are not subject to rate regulation by the commission.

[42] If the utility-owned station receives ratepayer funding and other regulatory-approved advantages, other entities might decide not to compete. The outcome would likely result in a smaller number of refueling stations in the long term.

[43] One related question is: If a commission allows a gas utility or its parent to own and operate a refueling station, should the station operate as a separate unregulated affiliate or as part of the regulated utility?

Cost recovery and ratemaking

1. What is the appropriate ratemaking method for NGV-related services provided by a utility (e.g., cost of service, promotional rates, separate rates for customers with home refueling appliances)?[44]

2. Who should pay for initial infrastructure development? If ratepayers fund this development, how should utilities recover the expenditures? Should commissions limit recovery to "start-up" activities that would help bolster the NGV market?

3. Who should pay for any NGV promotional or development costs (e.g., R&D expenditures, marketing, customer education)?

4. How should commissions treat the costs associated with home refueling appliances (e.g., rate-basing, lease agreement between the utility and the customer)?

5. How should commissions treat the costs associated with central refueling stations owned by the gas utility?

6. How should commissions review those utility costs paid to an affiliate for the provision of services associated with NGVs?

[44] Home refueling appliances allow NGV owners to refuel their vehicles overnight in their homes, from their existing natural gas line. Residential customers with a home refueling appliance would tend to have higher annual load factors (i.e., a higher ratio of average usage to peak demand) than other residential customers. Utilities can, consequently, serve those customers at a lower average cost, and thereby economically justify charging them a lower rate than other residential customers.

Appendix: The Current Status of NGVs and Their Outlook

Where Do NGVs Stand Today?

NGVs currently have a minor presence in the U.S. transportation market. NGVs account for only about 110,000 of the 250 million motor vehicles in this country.[45] They originate either from new vehicles produced by an original equipment manufacturer (OEM) or the conversion of existing gasoline or diesel vehicles to NGVs.[46]

The majority of NGVs are either heavy-duty vehicles that travel limited distances (e.g., transit buses, school buses) or other fleet vehicles, such as refuse haulers, taxis, utility vehicles, and delivery trucks. Compared to petroleum vehicles, NGVs have (1) limited refueling availability, (2) higher vehicle costs, (3) shorter driving ranges, and (4) heavier fuel tanks. The combination of these factors largely explains the limited acceptability and use of NGVs in the U.S.

Most of the attention paid to AFVs so far has centered on electric plug-in and hybrid vehicles. Surprising to some readers, electric vehicles have higher life-cycle costs than NGVs.[47] Although electric vehicles do not directly consume fossil fuels that emit pollution, the incremental production of electricity might involve the burning of fossil fuels, such as coal. If state commissions encourage the promotion of electric vehicles, should they not have the same policy toward NGVs? Like electric vehicles, NGVs will reduce our dependency on foreign oil as well as contribute to a cleaner environment.

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[45] *See* RFF Study. In the same year, natural gas accounted for just 0.2 percent of the fuel used by all highway vehicles.

[46] Conversion of a gasoline or diesel fuel vehicle to an NGV requires changes in the fuel storage tank, the fueling receptacle or nozzle, and the engine. EPA regulations, according to some observers, have made conversions uneconomical. Vehicle owners consider conversion costs as upfront costs that they compare with the discounted fuel-cost savings and other benefits from conversion.

[47] *See* study cited in footnote 32.

With regard to the economic factors affecting NGVs, an MIT study explained that:

> The economic attractiveness of CNG [compressed natural gas] vehicles is determined by vehicle incremental cost, mileage driven per year and gasoline-CNG fuel price spread… Previous studies have shown that payback times of three years or less are needed for substantial market penetration. For recent fuel price spreads, low vehicle incremental cost (e.g., $3,000) and high mileage are necessary to meet this requirement. Also, the rate of penetration of CNG vehicles, even if economic, will depend on the provision of refueling infrastructure.[48]

A big challenge for NGVs is expanding the refueling infrastructure to include more stations and other sources of refueling.[49] Another challenge is narrowing the price difference between a conventional vehicle and an NGV. Overcoming the first challenge will demand a much higher number of NGVs to economically justify the building of more refueling stations. But achieving that would first require the building of more refueling stations—a classic chicken-and-egg problem that might justify some form of governmental or utility assistance. The second challenge might require government incentives to lower the purchase price of an NGV and stimulate the building of new refueling stations.[50]

In its *Annual Energy Outlook 2010*, the U.S. Energy Information Administration (EIA) highlighted obstacles that NGVs face in the heavy-duty market:

> Despite the price advantage that natural gas has had over diesel fuel in recent years (an advantage that is projected to increase over time in the Reference case), other factors—including higher vehicle costs, lower operating range, and limited fueling infrastructure—have severely limited market acceptance and penetration of natural gas vehicles…In addition to concerns about driving range and refueling, the residual value of HDNGVs [heavy-duty natural gas vehicles] in the secondary market is likely to be an important consideration for buyers. Also, purchase decisions can be influenced by other factors, such as weight limits on highways and bridges, which can make the considerable additional weight of CNG or LNG tanks a significant drawback in some market segments…The importance of range and refueling infrastructure barriers suggests that the best near-term market penetration opportunity for HDNGVs, some of whose incremental costs are already covered by tax credits, could be in *the market for*

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[48] See The Future of Natural Gas, at 51.

[49] An adequate infrastructure would also include maintenance and repair shops for NGVs.

[50] Tax incentives and other financial inducements have greatly assisted in the nascent development of alternative fuel vehicles (AFVs). Bipartisan support for NGVs and other AFVs will likely extend and expand governmental assistance in the future. But the current political environment might erase some if not all assistance, for budgetary reasons if for no other reason. Incentives under debate in the U.S. Congress at the time of this writing encompass fuel, infrastructure, and vehicle tax incentives. The fuel tax incentive expired at the end of 2009, and the other two tax incentives will expire at the end of 2010.

> *centrally fueled fleets that operate primarily within a limited distance from their base.*[51] [Emphasis added]

The market barriers identified earlier, however, do not necessarily represent market failures or problems that justify subsidies or other forms of governmental or utility assistance. In different contexts, market dynamics through technological improvements and better consumer information are often sufficient for mitigating, if not eliminating, these barriers.

The Outlook for NGVs

Electric plug-in and hybrid vehicles so far have received the most attention, but the situation could change in the future if NGVs and biofuels overcome certain obstacles and become more economical and acceptable to future vehicle owners.

The consensus among experts is that NGVs and electric vehicles can coexist to displace a portion of the market for conventional vehicles in urban fleets. The most promising markets for NGVs, based on the latest evidence, are commercial and government fleets. Specifically, NGVs' best bet is high-mileage urban (light and heavy) fleets with central refueling. The economic attractiveness of NGVs, compared to conventional vehicles, depends significantly on the life-cycle fuel savings. Fuel savings, in turn, hinge on the price spread between natural gas and gasoline or diesel fuel in addition to the number of miles driven.

The niche market for electric vehicles is the light-duty market.[52] NGVs and electric vehicles, therefore, have complementary features that together can reduce our dependency on foreign oil and improve our environment. Few analysts foresee NGVs as the predominant vehicle in any of the transportation markets. Almost all predict that petroleum vehicles will continue to dominate the motor vehicle market in the U.S. for the foreseeable future.[53]

Some analysts point to the likelihood that electric vehicles will increase the demand for natural gas more than NGVs will, to the extent that the additional electricity production will come from gas-fired generating facilities. The energy consulting firm IHS CERA expressed this view in a recent report:

> The infrastructure needs and higher costs will likely limit significant growth in natural gas vehicles…Very significant policy support would be needed, which

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[51] *See* EIA Analysis, at 33.

[52] According to most experts, NGVs as passenger cars are unlikely to develop as much as electric vehicles. Semi-trailer trucks are also unlikely candidates for natural gas. In one sense natural gas can produce large benefits because these trucks have high mileage and low fuel economy—features that would account for high fuel-cost savings from using natural gas. Because of their limited range, however, gas-fueled trucks would have to make more fill-ups, which truckers traveling long distances might find unacceptable.

[53] One exception is if the U.S. adopts stringent greenhouse gas legislation, which seems remote at the time of this writing. Such legislation could dramatically drive up the cost of gasoline and diesel fuel, at least relative to natural gas and other sources of energy that emit less carbon dioxide.

> would compete with policy support for higher efficiency, biofuels, and electric vehicles. The most likely growth market for natural gas in transportation would be through the electric power sector.[54]

A report by Resources for the Future (RFF) identifies several challenges that NGVs face:

> Yet even proponents of natural gas concede that these vehicles [NGVs] face significant obstacles to capturing a major share of the market. Irrespective of the vehicle type, there are concerns regarding economics—the equivalent gasoline or diesel vehicle is cheaper, although fuel costs are likely to be higher—as well as concerns about safety and availability of refueling stations. The latter is the "chicken and egg" problem: Vehicle users will not buy NGVs until they believe there are enough refueling stations, but there is little motivation to build an NGV refueling infrastructure until a sufficient number of vehicle owners demand the fuel. There are other concerns as well. The cruising range and cabin space of light-duty vehicles may be insufficient. Heavy-duty trucks may also have inadequate range unless they are fueled by liquefied natural gas (LNG). Intermediate weight trucks, buses, and refuse trucks already use natural gas in significant numbers, but represent a relatively small market.[55]

Economic assessments have shown that all AFVs will continue to require financial and other forms of subsidies for an indefinite period to have a discernible presence in the transportation market.[56] The NGV market, for example, will need assistance to reduce the price of NGVs and stimulate the development of fueling stations. The hope is that new technological advancements will ultimately make NGVs competitive with petroleum vehicles.[57] These advancements can lower the weight of the vehicle tank, as well as the cost of conversion kits and refueling stations. Another hope is that the cost of NGVs will substantially decline as the scale of production increases.

Increased penetration of NGVs should occur simultaneously with the availability of additional refueling stations. [58] Increased vehicle production should lead to higher demand for NGVs, as economies of scale would drive down vehicle prices.

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[54] *See* IHS CERA Study, at ES-7.

[55] See RFF Study, at 2.

[56] One exception to the need for continued subsidies is if the price of gasoline and diesel fuel soars to extremely high levels. Another exception is if the country enacts a stringent carbon policy that would drive up petroleum prices relative to natural gas prices.

[57] NGVs are a mature technology that has gained wide support in several countries. The technological improvements referred to here are mostly incremental in nature with the effect of making NGVs more economical.

[58] A higher number of refueling station can overcome what some refer to as the "range anxiety." This condition, which constitutes a major barrier to NGV development, exists because of drivers' concern over finding stations to refuel when necessary. NGVs have a shorter range

A factor in favor of NGVs over petroleum vehicles is the expectation of a growing gap between natural gas and oil prices in the future. Most forecasts call for the ratio of oil to natural gas prices to rise between 2010 and 2030.[59] This increase should enhance the economic attractiveness of NGVs.

NGVs will also become more competitive if Congress passes legislation on carbon dioxide restrictions. AFVs as a whole would benefit from driving up the cost of operating petroleum vehicles relative to electric vehicles and NGVs. A business-as-usual world, according to most analysts, would not result in rapid growth of NGVs in the U.S. transportation market. A MIT study, for example, projected that:

> Development of the U.S. vehicular transportation market using compressed natural gas (CNG) powered vehicles offers opportunities for expansion for natural gas use and reduction of CO_2 emissions, but it is unlikely in the near term that this will develop into a major new market for gas or make a substantial impact in U.S. oil dependence. However, significant penetration of the private vehicle market before mid-century emerges in our carbon-constrained scenario. Liquefied natural gas (LNG) does not currently appear to be economically attractive as a fuel for long-haul trucks because of cost and operational issues related to storage at -162 degrees Centigrade.[60]

Finally, a big challenge for NGVs is convincing the general public that NGVs are "green," similarly to the way in which many people perceive hybrid vehicles. Hybrid cars have become popular even though to many owners they are not economical. One important reason is that people want to show their neighbors, friends, and others that they are contributing to a cleaner environment. In other words, many people purchase hybrid cars for non-economic reasons. Would they buy NGVs for the same reasons? At this point, the jury is still out. Consumers might shift toward NGVs in moderate numbers if the economics change in favor of NGVs over other AFVs and petroleum vehicles.[61]

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than comparable gasoline or diesel-fuel vehicle because of increased vehicle weight and the lower energy density of natural gas. A larger fuel tank can increase the driving range of an NGV, but at the loss of fuel efficiency, cargo space and payload.

[59] *See*, for example, U.S. Energy Information Administration, *Annual Energy Outlook 2010*, May 2010.

[60] *See* The Future of Natural Gas, at xiv.

[61] Even if the economics are favorable, consumers might still not shift to NGVs. They might, for example, have less-than-adequate information on the economic benefits of NGVs. Inertia can also inhibit them from switching to a non-petroleum vehicle even when it would be in their self-interest. Finally, consumers might focus on the initial higher cost for NGVs, paying inadequate attention to the life-cycle cost. Responding to these market problems might justify governmental and utility intervention.

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the attached Supplemental Responses to Requests 18 and 19 of Tennessee Fuel and Convenience Store Association's first set of Discovery Requests was served upon the parties in this action by electronic mail and by depositing a copy of the same in the United States Mail, First Class Postage Prepaid, addressed as follows:

Counsel for Tennessee Fuel & Convenience Store Assoc.	**Counsel for the Consumer Advocate and Protection Division of the Office of the Attorney General**
Melvin J. Malone Butler Snow Suite 1600 150 Third Avenue South Nashville, TN 37201	Wayne Irvin Assistant Attorney General Office of the Tennessee Attorney General Consumer Advocate and Protection Division P. O. Box 20207 Nashville, TN 37202-0207

This the 30th day of December, 2014.

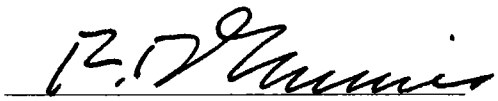


EXHIBIT __(KTV-4)

The Compelling Case For NGVs in Fleets

(and the potential for consumer market adoption)

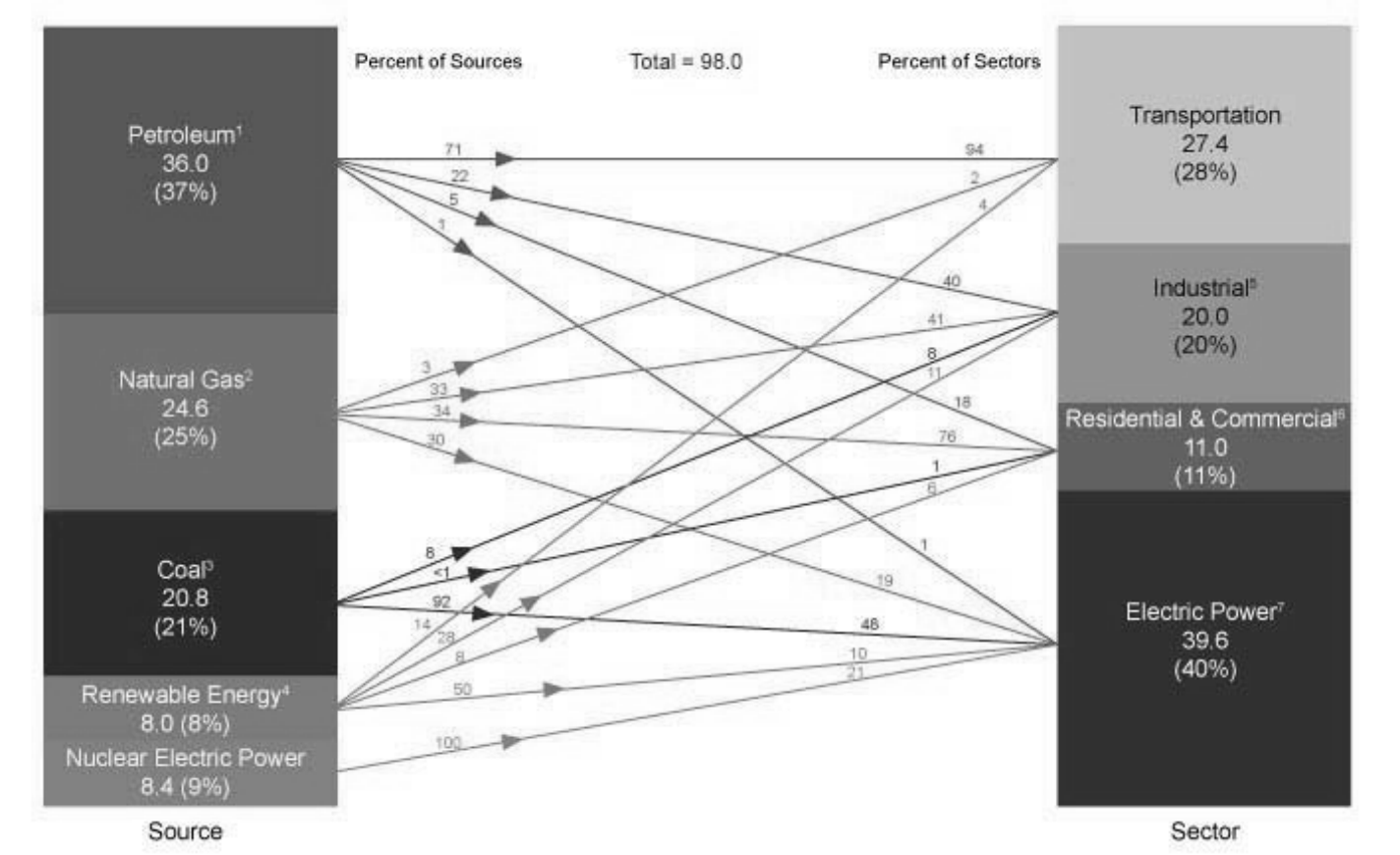
Work product of
Stephe Yborra - Director of Market Development
NGVAmerica

Director of Market Analysis, Education & Communications
Clean Vehicle Education Foundation

(last updated September 4, 2014)

NGVAMERICA
Natural Gas Vehicles for America

Snapshot of Energy Supply and End Use



- Transportation (on-road, off-road, rail, marine and aviation) = ~28% of all energy use
- ~71% of all oil is for transportation
- On-road vehicles account for ~60% of all petroleum use

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Natural Gas Vehicles for America

What is the Compelling Case?

- Environmental, energy security and – now, more than ever due to domestic natural gas abundance - ***economic*** market drivers are behind the trend toward greater use of NGVs. While fleet fuel use has been the primary focus, potential consumer market is now spurring additional investment in infrastructure.

- A growing selection of light-, medium- and heavy-duty NGVs are available from OEMs and SVMs, delivering performance and reliability that are on par with gasoline and diesel counterparts.

- A variety of fueling options are available – LDCs, E&Ps, leasing companies, other customers and independent fuel retailers – both NGV-focused and, now, more traditional fuel retailers - are engaging to develop fueling infrastructure.

- Natural gas is America's fuel: America's resource, America's jobs. Reduced reliance on volatile foreign oil supplies = Energy Security

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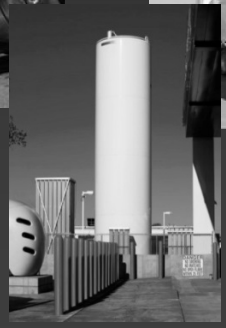
Overview of LNG / CNG

Liquefied Natural gas (LNG)

- Cryogenically cooled natural gas @ ~(260)F; high energy density -> reduced space requirements; “use it or lose it” fuel -> minimize heat/pressure gain to avoid fuel loss.
- Stored in liquid form onboard vehicle, vaporized before it enters engine.
- Presently used in heavy-duty fleets only.
- Also option for locations without pipeline gas.



Compressed Natural gas (CNG)

- Low pressure utility gas piped to station, then compressed and 1) stored in 4500+ psi pressure vessels in advance for fast fill of vehicles or 2) delivered to vehicles’ onboard storage cylinders at 3600 psi (time-fill).
- Vehicle cylinder op. pressure: 3600 psi

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Snapshot of US NGV Market Today

- Existing NGV inventory: ~150K (as of August 2014)
  - ~37,000 HDVs
    - 11,000 buses
    - 5,500 school bus
    - 8,000+ refuse
    - 7,500 ports/regional haul
    - 5,000 muni/F&B/Misc
  - ~88,000 LDVs (fleet and consumer)
    - Cars/SUVs, p.u. trucks/vans
  - ~25,000 MDVs
    - 9,500 gov't
    - 2,00 package delivery
    - 3,000 airport/university/ community shuttle
    - 10,500 utilities, F&B, comm. services, household goods, construction, misc
- 2012: ~17,450 NGVs added to US roads (net gain of ~10K vehicles)
- 2013: ~19,600 NGVs added (net gain of ~ 12K vehicles)
- 2014: ~24,000 production projected (net gain: ~15-18K vehicles)

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Independent Forecasts

- Widely varying estimates of future growth but ALL are bullish
  - Frost & Sullivan:
    - By 2017, 8% of ~370K Class 6-8 truck market (30K trucks)
    - Doesn't even factor in Class 3-5 market (step vans, small box trucks, c/c utility work trucks, shuttles)
  - National Petroleum Council (NPC) study: Under "aggressive" (high oil price) scenario shows, by 2050
    - ~50 percent of LD market
    - ~35 percent of Class 3-6 truck market
    - ~50 percent of Class 7-8 truck market
- Even if we fall short of optimistic projections, growth is still phenomenal

Snapshot of US NGV Market Today

- Vehicular natural gas consumption :~10-15% AGR past 7 years
  - 2005: ~200MM GGE
  - 2011: ~325MM GGE
  - 2012: ~350MM GGE
  - 2013: ~400MM GGE
  - 2014: likely 500+MM GGE as more MDVs and HDVs hit the road
  - Factors affecting future growth and timeframe include pace of worldwide economic recovery, continued petroleum-natural gas differential, expanded engine/vehicle choices, policy/regulatory framework
  - Vehicle, fuel and station tax credits, grants can accelerate adoption

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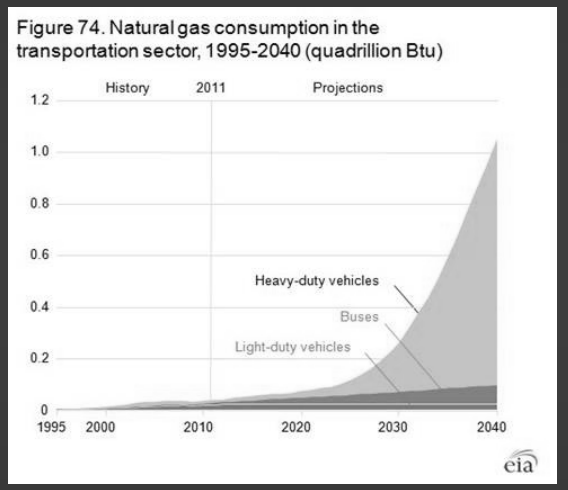
Energy Use in On-Road Transportation

- Total on-road transportation energy usage translated to natural gas volumes: 21.97 Tcf (based on 2010 PDD data):
  - Heavy-duty freight: 4.41
  - Commercial light trucks: 25% 0.59
  - Buses: 0.27
  - Light-duty: 16.7



- Widely varying forecasts but ALL point to "hockey stick" growth curve →
  Ex:
  - US DOE EIA forecast: 1.2 Tcf by 2040
  - PIRA Consulting: 5.1 Tcf by 2030 (= 24% of today's on-road energy use)
  - Other independent forecasts fall between these two extremes

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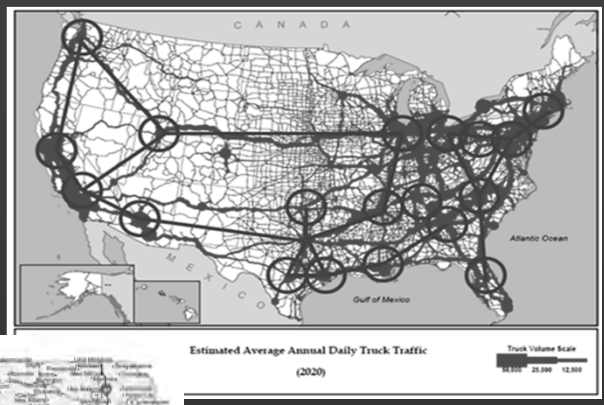
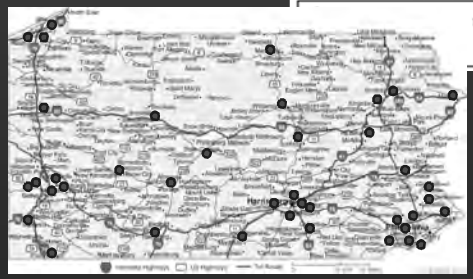
Snapshot of US NGV Market Today

- Station count: ~1520 after steadily growth in past 36-48 months
  - 2013: ~250 new stations. 2014: 20-30 stations/month
- Growth in installed capacity far greater than growth in station counts.
  - Newer stations tend to be larger, based on better economics of "anchor loads" or aggregated loads; some existing stations upgraded to meet load demands
- About half are "public access;" emphasis today is on upgrading experience to meet public expectations.

- Co-development of metro hub-and-spoke and corridor networks. CNG capturing most of local hub and spoke and many regional and super-regional trucking applications.
- Increased LNG infrastructure is in place and expanding to serve growing list of long haul OTR operators on Interstates





Hypothetical PA example based on key pop. centers, travel patterns:

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Multiple Stakeholders Are Engaging NGV Fueling Infrastructure Development

- Local gas distribution cos. (LDCs)
- Natural gas retail fuel sellers
- Gas exploration & production cos.
- Leasing companies
- Customers
- "Traditional" fuel retailers
  - C-Stores
  - Truck Stops
  - Grocery/Warehouse stores

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Truck Stops Are Embracing Public-Access Fueling Infrastructure

- Pilot/Flying J partnered with Clean Energy to develop LNG (and potentially L/CNG) stations across the country.
- Love's is developing CNG locations in the Midwest and South Central regions.
- TravelCenters of America/Shell partnership to install LNG capability at 100 locations
- Trillium, TruStar, GAIN, Questar, Nuovo, and other station developers currently partnering with more than a dozen additional TSO chains and independents to install natural gas fueling capability

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C-Stores Are Embracing Public-Access Fueling Infrastructure

- Kwik Trip has installed LNG and CNG dispensing capability at its central warehouse/HQ in LaCrosse, WI and adding CNG and/or L/CNG at additional 35+ retail locations throughout their 3-state trading area (KT's fleet is serving as its own "partial anchor load")

- OnCue Express has built multiple locations in OK and AR…. focus is on light-duty commercial and retail consumer sales.

- Additional C-store chains are in process of evaluating and/or installing similar options either alone or in partnerships.

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Customers Are Embracing Public-Access Fueling Infrastructure

- Waste Management has been co-developing retail locations under the Clean-N-Green brand. WM fleet serves as anchor load inside the fence (primarily time fill) while promoting to public outside the fence (and extending their “green” messaging)

- Transit agencies, municipalities, F&B companies, other small businesses are collaborating with other fleets to aggregate load to meet critical throughput thresholds.

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Freedom CNG
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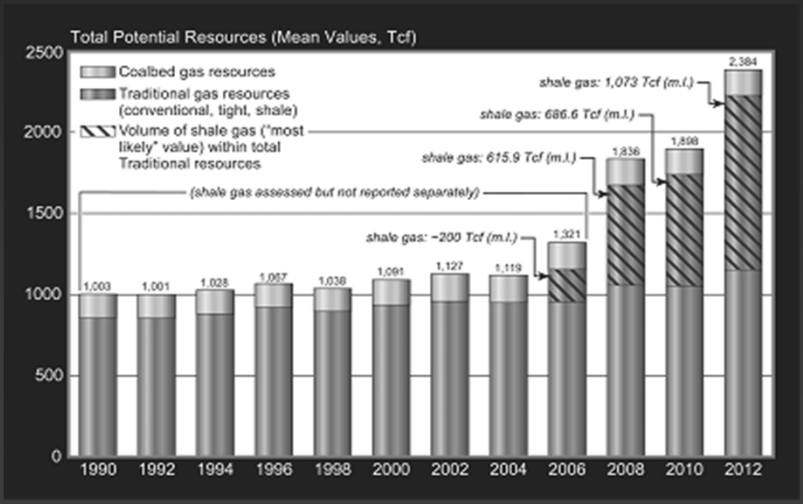
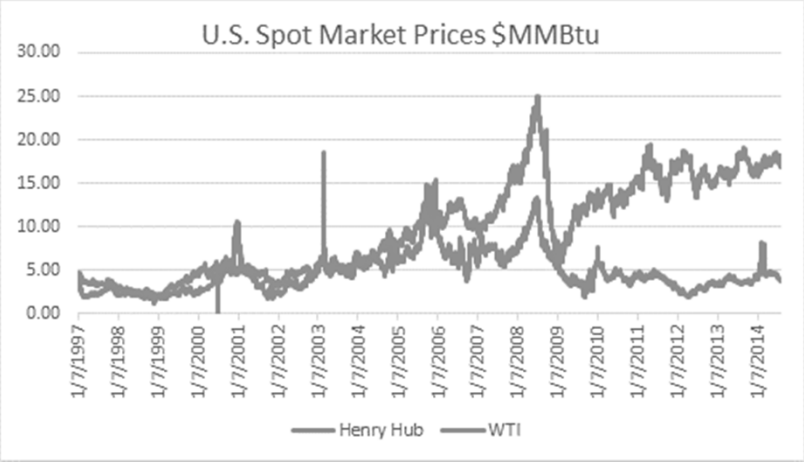
Natural Gas Abundance Drives Price Differential

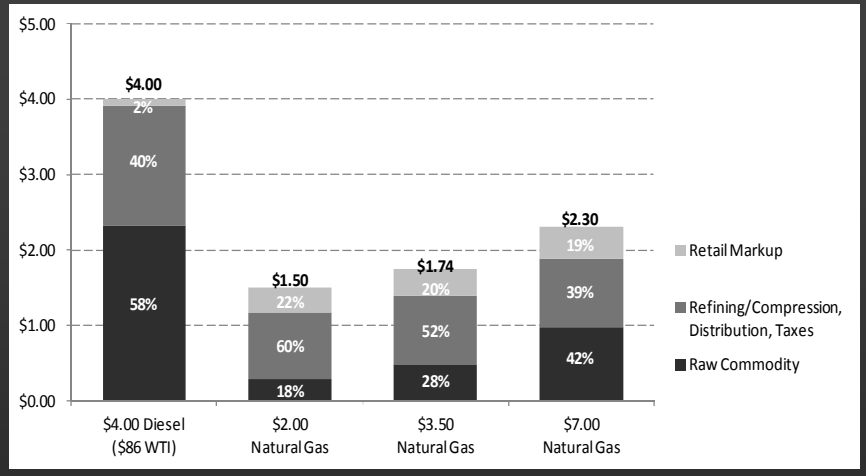


PGC Resource Assessments, 1990-2012

- **Technology improvements are expanding our economically recoverable base so much so that the estimated supply is now @ 115+ yrs!**
- **Natural gas and crude oil decoupled in 2008; favorable differential likely to remain/improve well into future**
- **Major difference between crude oil and natural gas as % of total fuel cost**



NG and Crude Oil Prices 1997-2014



Impact of base commodity on pump fuel price

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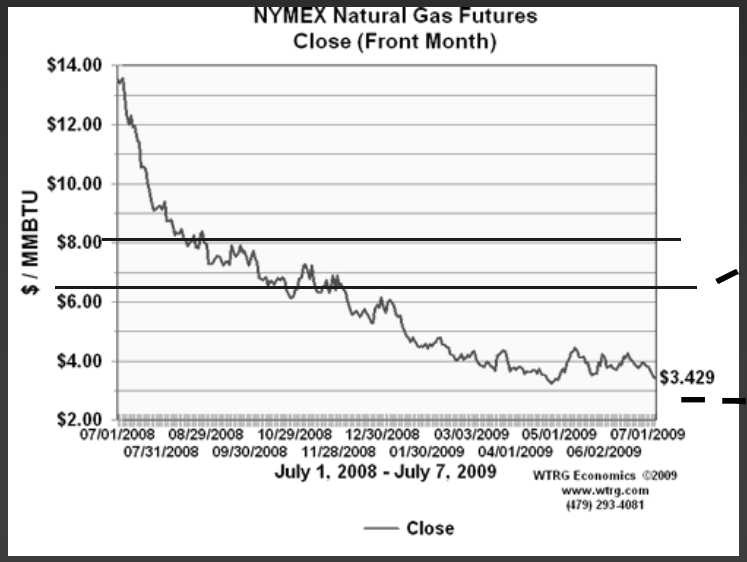
Translating Abundance into Savings



July 2008 – July 2009

Aug 2013 – August 2014

One MMBtu is ~8.0 GGE of (uncompressed) natural gas
One MMBtu is ~7.2 DGE of (uncompressed) natural gas.

- 2013 NYMEX MMBtu averaged $3.70; $.46/GGE ($.52/DGE).
- 2013-2014 “polar vortex” winter saw temporary escalation of cost/MMBtu
- Add costs of acquisition, regulated delivery tariff, compression electricity, maintenance, capital amortization and you still get $1.50-1.90/GGE + tax depending on where in the US station is located

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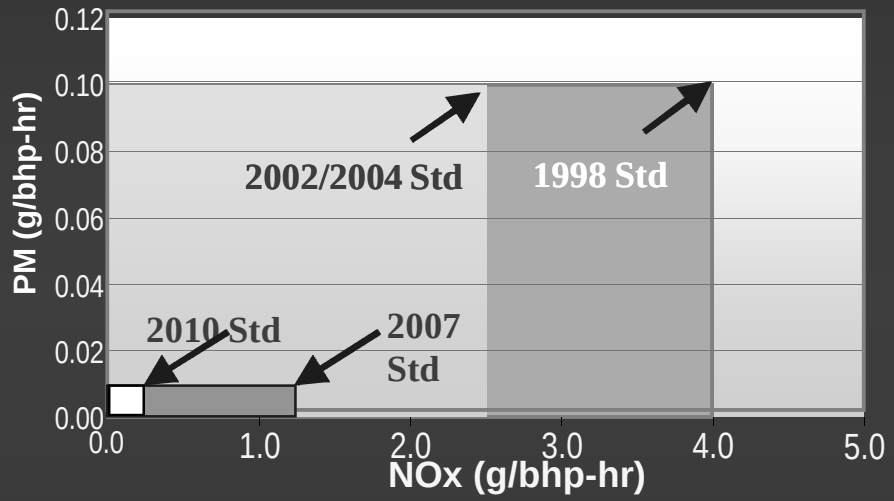
Emissions/AQ/Climate Change is a Market Driver of Change

- NAAQS, EPA Vehicle Requirements addressing criteria pollutants



- Diesel exhaust treatment strategy (DPF+SCR) has increased HDV purchase price and O&M cost, added complexity.
- **NG HDVs achieved 2010 requirements in 2007 w/o use DPFs/SCR**; maintenance-free TWC exhaust treatment system

- Latest focus is on greenhouse gas (GHG) emissions.
  - Phasing in vehicle GHG requirements: LDVs (2014); HDVs (1st 2013; next phase-in is 2018)
- **NGVs reduce GHGs significantly**
  - CEC study: 20-29% (HDVs: 20-23%; LDVs, 26-29%)
  - EPA GREET model: 15-20+%

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Energy Security and Diversity is a Market Driver For NGVs

- Diversifying America's Transportation Fuel Portfolio
  - Electricity
    - All-electric
    - Hybrids, PHEVs
  - Bio-diesel (B100) and blends
  - Ethanol
    - E85 (limited production/distribution – majority is in Midwest market)
    - Oxidant additive to gasoline (e.g. E10 gasoline – perhaps to be increased)
  - Propane
  - Natural Gas
  - Hydrogen
    - Internal combustion engines (H/CNG blends like Hythane)
    - Fuel cells (eventually)

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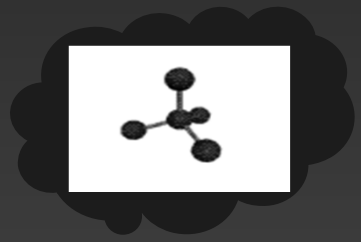
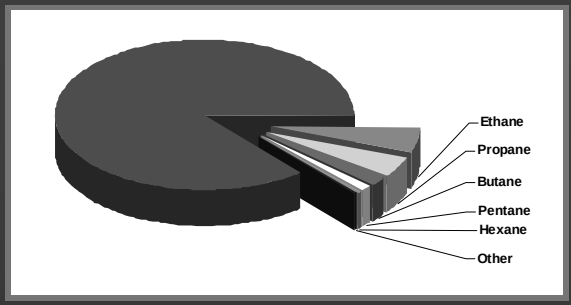
Natural Gas and the Hydrogen Future

- Natural gas and NGVs are the logical energy pathway and technology bridge to the hydrogen transportation energy future
  - Natural gas is 87-95% Methane
  - Methane is CH4 - 80% Hydrogen
  - Reform at station or on-board
  - H/CNG blending in internal combustion engines is likely precursor to wider use of H2
  - Market acceptance of gaseous fuel compression, storage vessels, engine maintenance
  - NGV industry is spearheading Codes & Standards development



Methane Molecule



- Still a LONG way to go before H2 vehicles are commercially viable and represent significant impact

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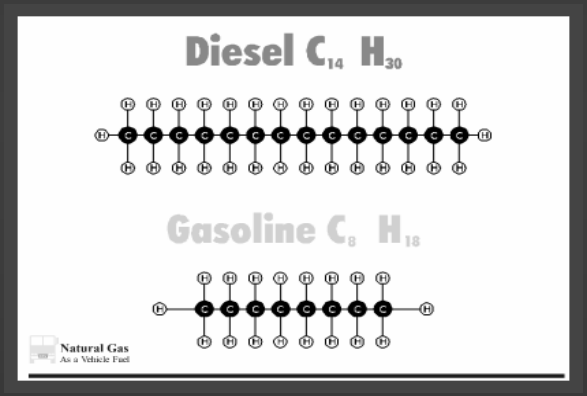
Benefits of Natural Gas/NGVs

- Natural gas is an inherently clean fuel
  - Natural gas is low-carbon fuel (CH4)
  - Less NOx, PM and GHGs
- Natural gas is very safe
  - Lighter than air; Limited combustion ratio (5-15%)
  - High ignition temperature: 1000+F
  - Colorless, odorless, non-toxic substance
  - Doesn't leak into groundwater
- NGVs are proven and reliable
  - 16+ million worldwide;
- NGVs are quiet
  - HDVs are 80-90% lower db than comparable diesel
- NGV life-cycle costs are significantly lower
  - Fuel costs are far lower!
  - Maintenance costs are =/< than gas or diesel

Methane Molecule



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Key Attributes and Best Prospects

- High fuel use vehicles with return-to-base operations or repetitive route or pre-set geographic operating areas

  -Regional / long haul freight truck – 18-25K DGE
  -Transit buses – 12-15K DGE
  -Refuse/Concrete trucks – 7.5-10K DGE
  -Municipal sweeper – 5-6K DGE
  -Airport shuttle service – 5.5-7.5K GGE
  -Local goods/svcs: F&B, Textiles etc – 7-10K DGE
  -Taxi - 4.5-5.5K GGE
  -School Bus – 2.5-3K GGE
  -High-mileage pick-up 2-2.5K GGE
  -Courier sedan, newspaper van, utility/ telecom van, public works pick-ups – 1.2-1.5K GGE

- Consumers have already shown that they will adopt given sufficient infrastructure, despite less attractive economic value proposition

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Growing Selection of NGVs from OEMs, SVMs

HD Truck OEMs

- Freightliner Truck
- Volvo
- International
- Kenworth
- Peterbilt
- Mack

HD Vocational OEMs

- Mack
- Peterbilt
- Crane Carrier
- Autocar Truck
- ALF Condor
- Elgin
- Johnston
- Schwarze
- Tymco
- Capacity
- Ottawa

HD Bus OEMs

- Thomas Built Bus
- Blue Bird Bus
- Optima/NABI
- El Dorado
- New Flyer
- Motor Coach Ind.
- Gillig
- DesignLine

HD Retrofit/Repowers

- American Power Group
- Clean Air Power
- Fyda Energy Solutions
- NGV Motori
- Omnitek Engineering
- Diesel 2 Gas

Dual fuel retrofits and SING repowers of Cummins, Daimler, Navistar, Detroit Diesel, Mack, Volvo, Caterpillar

LD OEMs

- American Honda
- General Motors
- Chrysler Ram Trucks
- Ford*

LD/MD Retrofits*

- Altech-Eco
- Landi Renzo/Baytech
- IMPCO Automotive
- Westport/BAF Technologies
- NGV Motori USA
- NatGasCar
- AGA Systems
- Greenkraft
- PowerFuel Conversions
- World CNG

Retrofits of GM, Ford, Dodge, VW, Mazda, Mitsubishi, Workhorse, Isuzu, JAC, Freightliner Custom Chassis platforms

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LDVs Available from OEMs

Honda Natural Gas Civic Sedan (dedicated)

GM Silverado/Sierra pick-up (bi-fuel)

GM Express/Savana Cargo & Passenger Vans (dedicated)

Ram 2500 dual-cab pick-up (bi-fuel)

NEW! MY 2015 Bi-fuel GM Impala (late summer 2014)

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LDVs, MDVs Available Through SVMs

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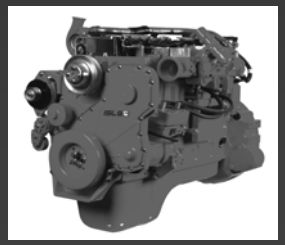
OEM HD Natural Gas Powertrains

CWI 8.9L ISL-G	**CWI 11.9L ISX-G**	**(earliest 2016) Volvo 13L D13**	**(4thQ 2015) CWI 6.7L ISB-G**	**(2016?) Cummins 15L ISX-G**
		?	?	?
• Spark Ignition	• Spark Ignition	• Diesel Pilot	• Spark Ignition	• Spark Ignition
• CNG or LNG	• CNG or LNG	• LNG Only	• CNG or LNG	• CNG or LNG
• Peak Rating:	• Peak Rating:	• Peak Rating:	• Peak Rating:	• Peak Rating:
– 320 hp / 1,000 ft-lbs	– 400 hp / 1,450 ft-lbs	455hp / 1750 ft-lbs	– ~260 hp / ~660 ft-lbs	– hp /torque TBD

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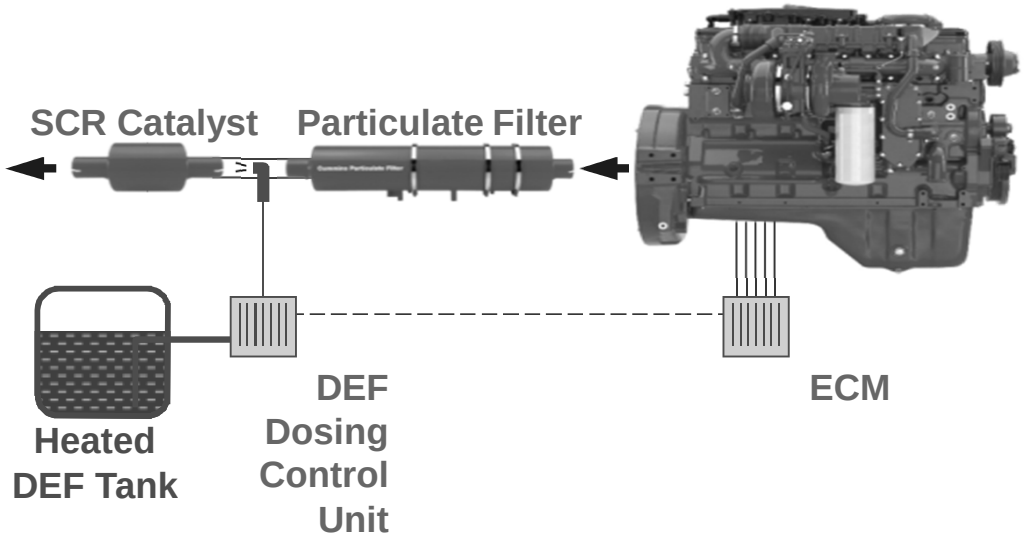
Exhaust After-treatment Comparison of Diesel vs S.I.N.G.

ISL9

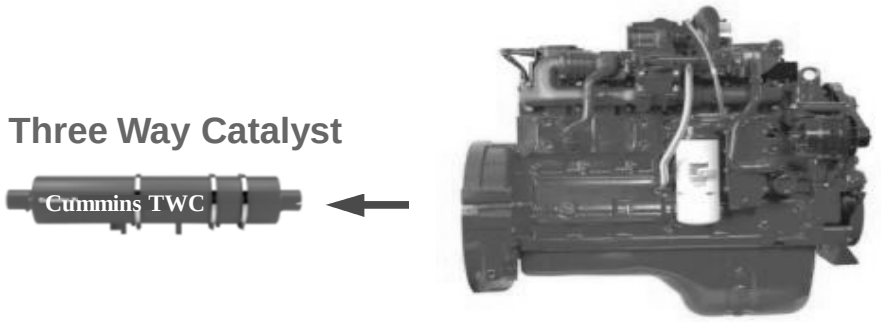
(diesel)



(Lean burn combustion with filter to capture particulate and SCR for NOx reduction)

ISL G

(natural gas)



(Stoichiometric combustion with Cooled EGR + 3-Way Catalyst)

Transit and School Bus Platforms

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Vocational/Specialty Trucks with CWI OEM Engine















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Local-Regional Haul/Line Haul with CWI OEM Engine











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Dual Fuel Technologies: Re-emerging Opportunity

- Dual fuel technology is making a comeback, primarily applied to “Intermediate Use (IUL)” and “Out of Useful Life (OUL)” HD engine applications either for legacy fleets or for use of older engine in new glider
  - Varying amounts of diesel is displaced by natural gas during duty cycle (0-70%; avg ~40-55% per drive cycle)

- 3/11 - EPA established “approval” process that reduced cost and data burden. “Approval” process still requires technical supporting documentation; field data. Beware of errant info on web sites about systems not needing EPA certification or approval.
- Presently, 500+ engine families have been approved and more are added each month
  - American Power Group, Clean Air Power, NGV Motori, Fyda, Landi Renzo, Diesel 2 Gas

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Dollars and Sense

NGV Economics:
Components of CNG Cost,
Calculating Simple Payback
and
Life-Cycle Cost Savings

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Components of (Fully-Loaded) CNG Cost

- Gas Bill:
  - Unregulated portion associated with purchasing gas
  - Regulated local gas utility distribution company (LDC) services
- Compression
  - Electric motor KWH and KW …OR engine driven unit's natural gas use
- Station Maintenance
  - Normal PM, scheduled replacement of parts, compressor rebuilds
- Capital /equipment amortization
  - Amortized cost of equipment or cost of capital factored into GGE price
- Federal, state and local excise fuel taxes (if applicable)
  - Tax is paid by the fuel seller; tax status of buyer determines
- Margin

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Components of CNG Cost

- Gas company bill (unregulated portion)
  - Commodity:

    Gas is drawn from wells, gathered/ pooled, stripped of impurities and “heavy” gases, then transported to “hubs” where it is available on the commodities market. Henry Hub (Louisiana) is used for NYMEX pricing.

    US DOE and industry long term price forecasts (prior to the economic collapse) pegged NYMEX natural gas at $6.50-8.00/MCF. Impact of shale gas is being reflected in more recent forecasts.

    Future market projections for gas are still up in the air now that shale gas has changed the equation

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Components of CNG Cost

Gas company bill (unregulated portion):

Gas Commodity:

- One cubic foot = ~1000 BTUs (Note: cf = volume, BTU = energy)
- One Mcf = 1000 cubic feet
- One Mcf = 1000cf x ~1000Btu/cf = ~1,000,000 Btus (MMBtu or dekatherm)

- Gasoline Gallon = 124,800Btu; Diesel Gallon = 138,700Btu… thus:
- **One MMBtu = roughly 8.0 GGE of (uncompressed) natural gas**
- **One MMBtu = roughly 7.2 DGE of (uncompressed) natural gas**.

- Your local gas company buys gas at various prices and uses weighted formula to pass along commodity at cost….commodity cost is PART OF the purchased gas adjustment (PGA).

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Components of CNG Cost

- Gas company bill (unregulated portion):
  - In addition to commodity costs, Purchased Gas Cost Adjustment (PGC/PGA) includes costs associated with getting gas to LDC's gate.
    - Gas acquisition
    - Pipeline capacity and transmission; "balancing" charges
    - Storage to supplement pipeline flows during heaviest demand periods
  - These costs vary across the country but may range from $.75-$2/MMBtu
    - Storage is often about half that fee
  - Commercial and industrial customers with steady gas loads often elect to buy their own gas through a broker/marketer and "transport" via the LDC, thus eliminating/reducing fees associated with storage.
    - Commercial/industrial customers with process loads (e.g., bakeries, bottlers, dairies, laundries, manufacturing plants)
    - Fleets (regardless of their facility load)

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Components of CNG Cost

- Gas company bill (regulated portion):
  - Local utility distribution system charges a regulated tariff for delivery of gas from their city gate to your meter. This is a per-unit cost, not tied to the PGA. Rate typically includes:
    - Recovery of distribution system investment/depreciation
    - System operations and maintenance
    - Meter set / customer services
    - Administrative G&A
    - Other mandated fees / assessments
  - These tariffs are often stepped (i.e. larger volumes often earn lower rates)
  - Customers that do not meet minimum load requirements to qualify for ‘transportation” rates buy “bundled” gas service from their LDC. Those with sufficient load can opt to buy their own gas and pay LDC to transport.
    - Minimum amount required to qualify for transportation rate varies widely from one utility area to the next… as little as 10,000 DGE/year to as much as 150,000 DGE/year

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Components of CNG Cost

Sample case: commercial baking company with 20 step vans

- Gas Bill: $.85/GGE
  - Gas costs: ~$.59/GGE
    (based on estimated wellhead price of $4.00/MMBtu + $.75/MMBtu associated fees for transportation and services up to LDC city gate)
  - LDC's regulated city-gate-to-meter services: $.21/therm (~$0.26/GGE)
    (this rate may vary significantly from one utility to the next

    As noted previously, most customers obtain their natural gas via a "bundled" rate that is adjusted/calculated – usually monthly or quarterly - using regulated tariff + PGA (utility's recovery of cost of the natural gas + services related to buying that gas and getting it to their city gate). Some customers may have option of buying their own gas, making arrangements to get it to utility's city gate and then paying their utility to "transport" the CUSTOMER's gas to the customer's meter via the utility's lines

Components of CNG Cost

- Gas Bill: $.85/GGE
- Electric compression costs
  - Gas delivered to the customer has to be compressed.
  - Most stations use electric motors although many larger stations use natural gas engine-drive compressors (depends on local regs).
  - Be sure to factor in both KWH consumption and KW demand
  - Estimated @ 1 fully-loaded KWh/GGE – a bit less for larger stations and more for small stations
  - Varies significantly from one utility area to the next
  - Nat'l range:$.04 -.30/KWH – **: ~$.12/GGE**

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Components of CNG Cost

- Gas Bill: $.85/GGE
- Electric compression costs:$.12/GGE

- CNG stations require regular preventative maintenance/ service and occasional rebuilds of compressors and replacement of other parts.

- Cost per GGE will vary based on total throughput (generally, larger throughput = less cost/GGE due to economies of scale)

- Maintenance/Repair/Service: $.20-.50/GGE.: **$.30/GGE***

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Components of CNG Cost

- Gas Bill: $.85/GGE
- Electric compression costs: $.12/GGE
- Maintenance/Repair/Service: Assume average of $.30/GGE
- **Capital amortization of equipment: $.25-.60/GGE**
  - Station cost divided by total GGE over life of equipment
  - Depreciation (5 yrs,7 yrs,10 yrs?), Cost of capital, Utilization factor

  Example 1:
  - 20 veh. x 15 GGE/day x 5 days/wk = 1500 GGE/wk =~80,000 GGE/yr
  - 80,000 GGE/year x 10 yrs = 800,000 GGE
  - If 100 scfm 10-post/20-hose time-fill station cost is $400K, then **$.50/GGE**

  Example 2:
  - Ex 2: 20 veh. x 20 GGE/day x 6 days/wk = 2400 GGE/wk = ~125,000 GGE/yr
  - Same 100 scfm station, then **$.32/GGE**

  Example 2 using 7 year depreciation:
  - 125,000 GGE/year x 7 yrs = 875,000 GGEs = $.46/GGE

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Components of CNG Cost

- Gas Bill: $.85/GGE
- Electric compression costs: $.12/GGE
- Maintenance/Repair/Service: $.30/GGE
- Capital amortization of equipment: $.40/GGE

SUB-TOTAL:

- **$1.67 (use by or sales to tax exempt entities)**
- **$1.853 + state tax (use by or sales to taxable entities)**
  - Federal motor fuels excise tax: $0.183/GGE;
  - State motor fuels taxes vary significantly; in addition, some states tax natural gas the same as gasoline while others may tax at a lower rate than gasoline

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Components of CNG Cost

- **What if NYMEX MMBtu cost rose to $8.00/MMBtu?**

- **Gas Bill: $1.35/GGE**
  - **Gas acquisition cost: $1.09/GGE ($8.00+.75 = $8.75/8)**
  - LDC transportation tariff remains: $.26/GGE
- Electric compression costs: $.12/GGE
- Maintenance/Repair/Service: $.30/GGE
- Capital amortization of equipment: $.40/GGE

- **Tax exempt fuel sales: $2.17/GGE**
- **Taxable fuel sales: $2.353 + state tax/GGE**

- **At $8.00/MMBtu, oil is very likely to be well over $200+/barrel… easily equates to $5+ for diesel!**

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Medical Lab Courier Service

- Honda Civic Natural Gas sedan
- MPG: 31 (combined); 30K miles/year
- Fuel Use: 4GGE/day; 1000GGE/yr
- CNG Premium*: $6500
- Simple payback = 4.3yrs
  (based on $1.50/GGE savings)
- Life-Cycle Cost (LCC) Savings = $2550 (based on 6 year life)

- Grant: $3000; Remaining premium: $3500
- Simple Payback: 2.3yrs
- LCC savings: $5,550

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Cargo Van for Commercial Cleaning Services Business

- Chevy/GMC 3500 cargo van with PTO to run cleaning equipment; travel to/from location + 8-10 hrs/day @ 1200 rpm
- Fuel Use: 15GGE/day; 4000GGE/yr
- CNG Premium: ~$10,000
- Simple payback = 1.65 years
- LCC savings = $32,100 (based on 7yr life; $ 1.50/GGE savings)

- This business has 39 vehicles (x $6000+ fuel savings/vehicle) = $235-250K/year!

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Step Van/Box Truck

- Sample Applications (e.g., textile rental service, bread/chips bakery; furniture/mattress delivery)
- MPG: 6.0, 95mpd x6 dys/wk, 30K/yr
- Fuel Use: 16GGE/day; 5000GGE/yr
- CNG Premium: $20,000
- Simple payback = 2.65 years;
  LCC savings = $55,125
  (based on 10 yr life and 1.50 savings/GGE)

- Grant: $12,500; Remaining premium: $7,500
- Simple Payback: 1 yr; LCC savings: $67,500!!!

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Refuse Truck
(LCF model)

- Crane Carrier LET, Autocar Xpeditor, Peterbilt LCF 320, Condor , Mack TerraPro
- MPG: 2.5 – 3.0 (lots of idle and PTO time)
- Fuel Use: 35-40gge/day; 10,500DGE/yr
- CNG/LNG Premium: $30,000
- Simple payback: 1.6years and LCC savings = $117K
  (based on $1.75 savings/DGE and 8 year life)

- Grant $15,000 ; Remaining Premium: $15K
- Simple Payback: 0.8 years;
- LCC savings: $132K!

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Grocery Truck

- Volvo VNM/VNL, Freightliner M2/Cascadia
- MPG: 5.6 miles/DGE; 100K miles /year
- 17,850 DGE/yr
- CNG Premium (w 84 DGE capacity): $60,000
- Simple payback: 1.9yrs ($31,235 yr savings)
- Life-cycle cost savings: $159K!
  (based on $1.75/DGE savings, 7-year /700K life before resale)

- Grant $25K; Remaining Premium: $35K
- Simple Payback: = 1.1 yrs
  (based on 1.75 savings /DGE)
- Life-cycle cost savings: $185K!

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Observations About the Consumer Market

- Economics-focused value proposition is weak at this time.
  - Consumer fuel use/ year: 375-450 GGE; based on $1.50/GGE savings and $6500 premium, payback is 9-11 years. Many retrofit options cost even more.
- While LDV prices are coming down with competition and economies of scale, expectations of 50% reductions in the near future may be overly optimistic.
  - Investments in R&D/certification/approvals are significant; far greater sales are needed to amortize these fixed costs
  - High-pressure CNG cylinders involve expensive advanced materials and manufacturing processes using sophisticated tooling technology. Volume pricing from suppliers of raw materials (carbon fiber, aluminum, etc.), which exceed 60% of cylinder cost, will require near exponential increases in orders, assuming the material is available vis-à-vis other industries clamoring for same limited supplies. Advances in manufacturing are increasing production rates and increased orders are providing better amortization of fixed costs, and competition is trimming margins but it may be unrealistic to expect drastic reductions without significantly larger volumes.

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Observations About the Consumer Market

- If not economics, what is our value proposition?
- Significant sales potential (albeit small percentage of total LDV market) may be "early adopters" that often focus more on other "social" value propositions:
  - Environmental – "I'm doing my part to reduce pollution"
  - Energy Security/Patriotism - "I'm reducing reliance on foreign oil by using an American fuel and contributing to American jobs and American economy"
  - Technology – "I like using (and being seen using) advanced technology"
  - Socially forward thinking – "I believe in contributing my part to solutions to our collective challenges, even when the economics are marginal – money isn't everything" (I pay extra for "green power" on my electric bill, I support local businesses even when they cost more than the discount superstore, etc).
- Other value propositions
  - HOV access - maximizes productive time in high density/heavy traffic markets
  - Low-cost/no-cost parking fro AFVs

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Observations About the Consumer Market

- Limited platform availability
  - Only 2 OEM LDVs are available at this time and a limited number of SVM options (most are SUVs, vans or pick-ups; OEM pick-ups are ¾ ton)
  - Sales/service channels are still nascent; warranty confusion abounds
  - Most consumer vehicles are used fleet vehicles and/or SVM aftermarket retrofits (including non-EPA-certified systems installed by upfitters who may/may not be aware of/following codes governing safe installation – a growing safety concern)
- Consumers have shown willingness to adopt NGV technology in areas where more ubiquitous public fueling is available
  - Most successful when offered i/c/w established retailers where other non-fueling benefits are available (food/beverage, bathrooms, familiar dispensing technologies and payment options, ease of access to travel routes, lighting, etc)

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Observations About the Consumer Market

- Convenient home refueling, if priced right and reliable, will likely broaden the appeal and sales of consumer NGVs.
  - Current option (BRC FuelMaker "Phill") is expensive ($4.5-5K + installation for 0.45 GGE/hr) although others are in development
  - R&D into super low-cost systems is underway (ARPA-e). Target of $500 is still well off but interesting technology developments are being generated from R&D.
- Development of home refueling appliance ANSI standardis underway by CSA and industry stakeholders (NGV 5.1 – Residential Fueling Appliance)
  - Existence of Standard should spur mfr. investment and code official acceptance
  - Aggressive timetable – hope to publish by November 2014
  - Development similar to many other residential appliances
  - Key issues: high-pressure storage, fuel quality (water), gas flow reqs/allowances
  - Working to include reference to NGV 5.1 in other codes
- Regardless of unit price, cost will be add-on to vehicle premium so – again – probably something of particular interest to early adopters.

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Fill'er Up

Natural Gas Fuel Station Types

Development, Ownership and Operations Options

Sizing/Design Considerations

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CNG Fuel Station Types

- **Time-fill capability**
  CNG is dispensed slowly directly to vehicles' onboard storage tanks. Lower cost station investment. Best for fleets that return to central lot and sit idle overnight or for extended periods and do not need fast fill capability.
  Home fueling devices are time-fill applications.

- **Fast-fill capability**
  Similar to liquid fueling station, same fill rates and times. A MUST for public access. Also good for larger fleets where fueling turn-around time is short.

- **Combo-fill capability**
  Comprises both time-fill and fast-fill. Often good for fleets that can fuel on time-fill but need occasional "top off" or want/need ability to provide public access

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Q: How Do We Solve The "Chicken & Egg" Conundrum?
(A: Make a chicken-egg omelet*)

- Throughput (sales volume) is key to generating economies of scale for the public access station owner, thus allowing pump price differentials that drive reasonable payback and life-cycle savings for customers

- Minimum load thresholds vary based on a variety of factors including: station type, station size, fuel price differential, ability to amortize maintenance costs, equipment depreciation, grants, ROI/IRR expectations

- Achieve minimum load thresholds by:
  - Identifying an anchor fleet that justifies the investment…or
  - Aggregate several semi-anchor fleets' loads if their depots or operating areas are geographically acceptable…or
  - Create retail public access for small fleets and consumers….or
  - All of the above

* Erik Neandross, CEO – Gladstein Neandross & Associates

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Station Options

- Station Location Options:
  - Offsite – use existing public access station if available, convenient and of sufficient capacity. Anchor fleets or 'pooled loads' create economies of scale.
  - Onsite - private access only or with public access "outside the fence"

- Different ownership & operations options available depending on throughput, funding:
  - Fleet owned & operated station
  - Outsource station O&O entirely via independent fuel provider and contract gas price
  - Fleet owned/leased station but contracted out operations for a fee (usually on a GGE basis)

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Natural Gas Station Development and Ownership-Operations Options: #1

- Fleet owns & operates station
  - Fleet takes responsibility for building and then operating its own station. Fleet works with vendors or design consultant, manages build-out and takes responsibility for PM (parts, etc).
  - Applies to small-to-mid sized fleets that do not have offsite options nearby, b/c their fuel use does not meet the threshold required by most LDCs or independent developers to invest in developing, owning and operating station for them.
  - Some large fleets also opt for this but many do not have experience nor want responsibility for station operations and maintenance

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Natural Gas Station Development and Ownership-Operations Options: #2

- Outsource station development, ownership, O&M to independent fuel provider
  - Fleet serves as anchor for independent operator's station, contracts long term fuel agreement with set price(s) and expected throughput for duration.
  - One stop shop. All capital investment and O&M risks are borne by independent fuel provider while fleet focuses on core competencies.
  - Fleet usually provides low-cost lease for property – important to making deal work - land is costly!
  - Often allows fuel provider option to create public access as well – sometimes a "royalty" paid back to fleet for retail sales from premises

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Natural Gas Station Development and Ownership-Operations Options: #3

- Fleet owns/leases station but contracts out operations for a fee (e.g., monthly fee or GGE basis)
  - Option used by many large fleets that need/desire ownership of their own station equipment but want to reduce risk, assure best O&M practices, etc
  - Contract is often (but not always) awarded to the firm that builds station; usually a 5-7yr contract.
  - Some fleets that initially Own & Operate their own stations decide that they want to delegate to others – put out RFP for O&M contract
  - Decision weighs pros/cons of “leaving $ on table” versus potential downtime risks, maintaining parts inventories, updated training of techs, etc

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CNG Station Design Considerations

- How Much Fuel in How Much Time?
  - Vehicles/day, fuel/vehicle, fueling patterns
  - Maximum *daily* flow, maximum *hourly* flow, targeted fueling time per hose
  - Back-up fueling availability? Redundancy
- Real estate concerns
  - Proximity to major travel routes
  - Vehicle needs (entry/egress patterns)
  - Equipment footprint
  - Site development issues
- Equipment needs/performance/cost
  - Balance of compression and storage
  - Gas service (volumes/pressures, moisture)
  - Electric service (kVa, etc)
  - Dispensers and fuel management needs

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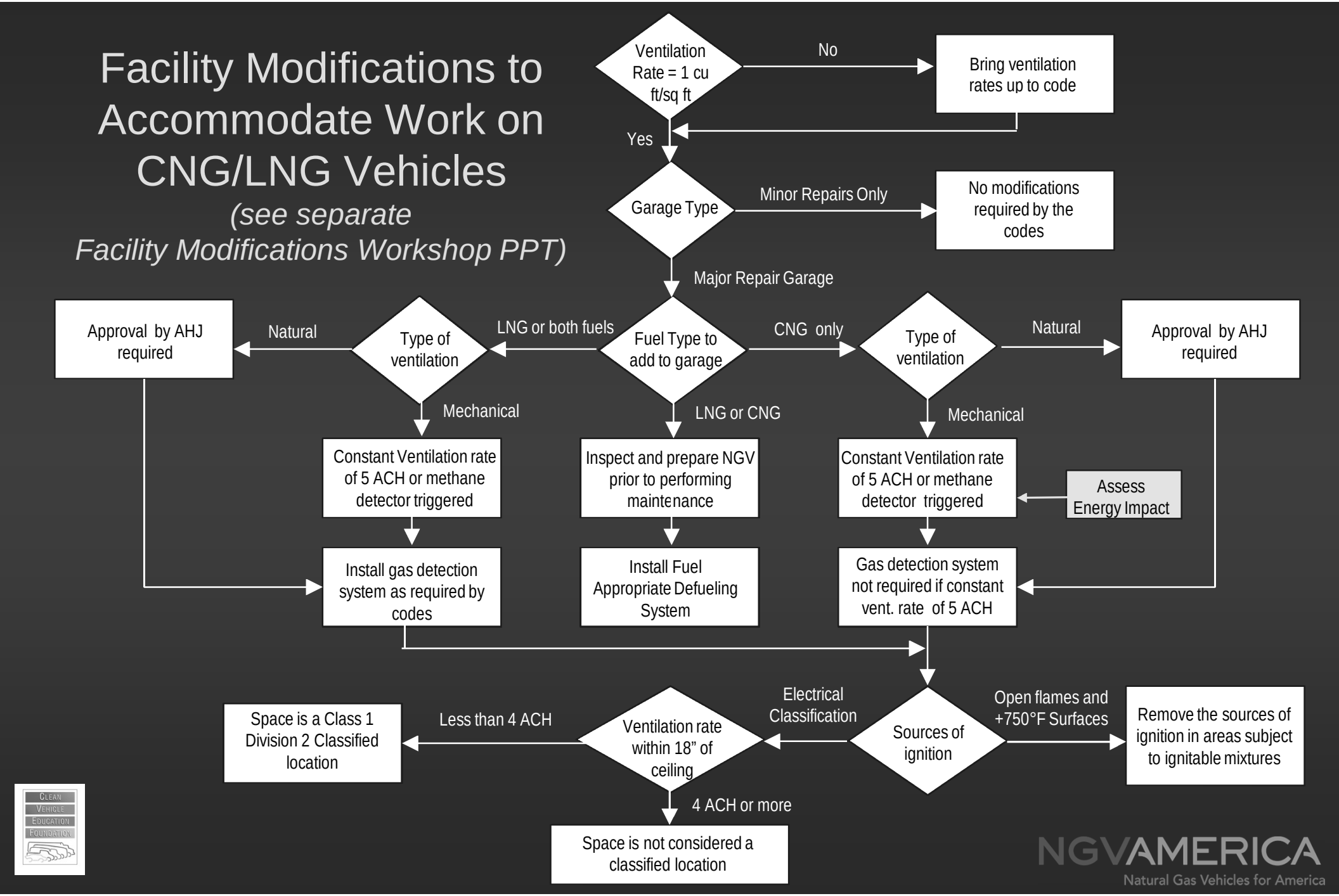
Facility Modifications to Accommodate Work on CNG/LNG Vehicles
(see separate Facility Modifications Workshop PPT)
Ventilation Rate = 1 cu ft/sq ft
No
Bring ventilation rates up to code
Yes
Garage Type
Minor Repairs Only
No modifications required by the codes
Major Repair Garage
Fuel Type to add to garage
LNG or both fuels
Type of ventilation
Natural
Approval by AHJ required
Mechanical
Constant Ventilation rate of 5 ACH or methane detector triggered
Install gas detection system as required by codes
LNG or CNG
Inspect and prepare NGV prior to performing maintenance
Install Fuel Appropriate Defueling System
CNG only
Type of ventilation
Natural
Approval by AHJ required
Mechanical
Constant Ventilation rate of 5 ACH or methane detector triggered
Assess Energy Impact
Gas detection system not required if constant vent. rate of 5 ACH
Sources of ignition
Electrical Classification
Open flames and +750°F Surfaces
Remove the sources of ignition in areas subject to ignitable mixtures
Ventilation rate within 18" of ceiling
Less than 4 ACH
Space is a Class 1 Division 2 Classified location
4 ACH or more
Space is not considered a classified location
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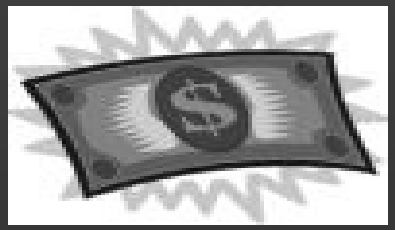
Implementation: How do we transition?

- Communicate benefits to your staff to get their “buy in” and to create feedback mechanisms that keep your program on track. Tell your customers; show environmental stewardship.

- Identify your internal champion, assemble stakeholders and resources; learn from others’ successes, don’t repeat mistakes… Use the resources of your Clean Cities Coalition

- Maximize use of OPM while it is available. Investigate other creative financing/leasing and station operation options. Learn how to purchase gas to lower fuel costs.



- Connect with your Clean Cities Coalition and fed/state agencies. Prepare fleet inventory replacement schedule and fuel use projections. Contact LDC, vehicle, fuel station development and/or equipment providers. Get started!

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5 Tips That Make Some Grant Applications More Successful Than Others

(as suggested by experienced Clean Cities Coordinators)

- Speak to the interest/evaluation criteria of the funding agency (Ex: *EPA – Emissions/AQ; DOE – Petroleum Reduction, etc)*
- Clearly spell out the proposed benefits, the criteria by which you plan to measure those benefits, the action plan and the proposed processes in place to manage resources/take corrective action mid-stream to achieve the goal(s).
- Leverage funding/expertise of multiple stakeholders
- Communicate succinctly and effectively
- Meet all the administrative requirements ON TIME

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