

**STATE OF VERMONT  
PUBLIC SERVICE BOARD**

Petition of Vermont Gas Systems, Inc., )  
requesting a Certificate of Public Good pursuant )  
to 30 V.S.A. § 248, authorizing the construction )  
of the “**Addison Natural Gas Project**” )  
consisting of approximately 43 miles of new )  
natural gas transmission pipeline in Chittenden )  
and Addison Counties, approximately 5 miles of )  
new distribution mainlines in Addison County, )  
together with three new gate stations in )  
Williston, New Haven, and Middlebury, )  
Vermont )

Docket No.

**PREFILED TESTIMONY OF  
JEFFREY B. CARR  
ON BEHALF OF  
VERMONT GAS SYSTEMS, INC.**

December 20, 2012  
[Corrected May 30, 2013](#)

The purpose of Mr. Carr’s testimony is to address the economic benefit criterion (30 V.S.A. § 248(b)(4)) for the Addison Natural Gas Project.

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Exhibit Petitioner JC-2               Summary Tabulation of Economic Study

Exhibit Petitioner JC-2(Rev)(5/30/13)      Corrected Summary Tabulation of  
Economic Study

Exhibit Petitioner JC-2(Diff)(5/30/13)      Differences between Exhibit Petitioner JC-2  
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Exhibit Petitioner JC-3      Summary Tabulation of Alternative Economic  
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Exhibit Petitioner JC-3(Rev)(5/30/13)      Corrected Summary Tabulation of  
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Exhibit Petitioner JC-3(Diff)(5/30/13)      Differences between Exhibit Petitioner JC-3  
and JC-3(Rev)(5/30/13)

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1           **1. Introduction**

2    Q1.    Please state your name, occupation, and business address.

3    A1.    My name is Jeffrey B. Carr. I am the President and a Senior Economist at  
4           Economic and Policy Resources, Inc. My business address is 400 Cornerstone  
5           Drive, Williston, Vermont. Our firm has served as the Vermont State Economist  
6           for the past five gubernatorial administrations.

7

8    Q2.    Please describe your education and employment background.

9    A2.    I have earned a bachelor’s of science and a master’s in science from the  
10           University of Vermont. I served as an economist on the policy staff of Governor  
11           Richard Snelling between August of 1980 and October of 1984. Between  
12           October of 1984 and November of 1985, I held the position of Economist and  
13           Research Director for a nonpartisan national education organization called

1 Proposition One—which conducted research, published articles, and made public  
2 presentations regarding issues related to federal fiscal policy, the federal deficit,  
3 and ways to address the then increasing federal debt. From November of 1985  
4 through January of 1987, I was Director of Research for the campaign of a  
5 candidate for the U.S. Senate. I subsequently served as Legislative Director-  
6 Economist on the Washington D.C. Congressional staff of Congressman  
7 William D. Schuette of the then 10<sup>th</sup> Congressional District in Michigan from  
8 March of 1987 to July of 1989. In July of 1989, I entered private practice as a  
9 professional economist at Economic & Policy Resources, Inc. and have remained  
10 with the practice since that time. I began serving as President of the firm in 2006  
11 and hold that position today. My resume is attached as Exhibit Petitioner JC-1.

12  
13 Q3. What is the nature of the economic services that Economic & Policy Resources,  
14 Inc. (“EPR”) provides to its clients?

15 A3. EPR undertakes economic, finance, and public policy studies to assist public and  
16 private clients throughout North America to understand economic issues they face  
17 in their business and to design and implement solutions to support their business  
18 strategies. EPR employs economic and finance analytics to examine, test, and  
19 forecast possible solutions. In the field of applied economics, EPR is recognized  
20 for developing and authoring comprehensive impact studies prepared to predict  
21 the economic outcome of developmental events just such as that proposed by

1 Vermont Gas Systems, Inc. (“Vermont Gas,” “VGS,” or the “Company”) in this  
2 proceeding.

3

4 Q4. Have you previously provided testimony before the Vermont Public Service  
5 Board (“the Board”)?

6 A4. I have not. However, I have provided testimony in proceedings before numerous  
7 judicial and legislative bodies over 25 years of professional practice.

8

9 Q5 What is the purpose of your testimony?

10 A5. My testimony presents and summarizes an impact study undertaken to examine  
11 the economic impact to Vermont of the Addison Natural Gas Project (“Project” or  
12 “ANGP”), which was prepared by our firm under my direction. The study  
13 demonstrates that the Project satisfies the requirements of 30 V.S.A. § 248(b)(4),  
14 which provides that a transmission facility should provide an economic benefit to  
15 the state and its residents. I summarize the findings and conclusions in this  
16 testimony and in the attached tabulations included with this filing as Exhibit  
17 Petitioner JC-2(Rev)(5/30/13).

18

19 **2. Economic Benefit Analysis (30 V.S.A. § 248(b)(4))**

20 Q6. Please describe the Vermont and northwestern Vermont regional economy and  
21 demographics in the area of the proposed Project.

1 A6. In absolute terms, the Vermont economy can be dimensioned as a state economy  
2 of \$25.9 Billion in Gross Domestic Product in 2011 as reported and measured by  
3 the U.S. Department of Commerce, Bureau of Economic Analysis. A total of  
4 626,431 people reside in Vermont and of that total, 36,742 people reside in  
5 Addison County as of July 2011. As of 2011, there are a total of 256,711  
6 households in Vermont and 14,159 of that total are in Addison County. VGS has  
7 a long presence in Franklin and Chittenden County in northwestern Vermont and  
8 the proposed Project will expand that presence south down the Lake Champlain  
9 valley into Addison County. Employment in Vermont totals 339,100 out of a  
10 civilian labor force of 359,200 as of 2011. This equates to an unemployment rate  
11 of 5.6% as of that date. Total employment in Addison County is 20,500 as of  
12 2011. The proposed Project will expand natural gas service into Addison County  
13 as part of a long-term expansion plan to serve Rutland County and eventually  
14 connect the Vermont Gas transmission and distributions systems to the American  
15 gas system.

16  
17 Q7. Please summarize the approach EPR employed to estimate the economic impacts  
18 of the proposed Project to the state of Vermont.

19 A7. The availability of natural gas in Addison County will provide households and  
20 businesses with access to a source of lower cost thermal energy to meet  
21 requirements for heating, domestic hot water, and cooking in the case of

1 households and commercial establishments, and for process energy in the case of  
2 industry users. We start our analysis by comparing the aggregate energy bill of  
3 households and businesses in Addison County without access to natural gas in a  
4 scenario where natural gas is available to Addison County. The economic impact  
5 of lower energy costs for households and businesses in Addison County and the  
6 increased costs to customers in the existing VGS service territory as a result of the  
7 System Expansion and Reliability Fund (the “Fund”)<sup>1</sup> become inputs to an  
8 economic input/output model of the Vermont economy to study the aggregate  
9 economic benefits and costs to the Vermont economy. Specifically, we examine  
10 four components to determine the total aggregate benefits to the Vermont  
11 economy and Vermont residents. These components are:

- 12 1. The impact of capital investment through (a) the construction of the  
13 transmission and distribution lines that will be undertaken by VGS;  
14 and (b) capital expenditures by households and businesses for  
15 necessary equipment (e.g., furnace, boiler, heater) to switch to natural  
16 gas. Construction of a gas transmission line and the associated  
17 distribution system as well as the necessary household/business  
18 connection equipment to serve Vergennes and Middlebury represent  
19 increased capital stock to the Vermont economy;

---

<sup>1</sup> The Fund was approved by the Public Service Board in Docket No. 7712 and has been in effect since April, 2011.

- 1                   2. The aggregate economic impact to the household sector of lower  
2                   energy bills following the increased availability of natural gas in  
3                   Addison County;
- 4                   3. The aggregate economic impact to the commercial sector and the  
5                   industrial sector (composed of interruptible customers) of lower  
6                   energy bills following increased availability of natural gas in Addison  
7                   County; and
- 8                   4. The economic impacts associated with households and  
9                   businesses/industries in substituting natural gas for fuel oil and  
10                  propane in the Addison County energy market.

11

12                  Collectively these individual components describe and quantify the direct  
13                  economic impact of expanded availability of natural gas to Addison County.

14

15   Q8.    You refer to the components you describe as “direct” impacts. Please explain  
16            why you use the term “direct” and why it has meaning in the economic analysis  
17            you performed.

18   A8.    The “direct” impacts are those initial changes related to the Project that circulate  
19            throughout the economy, such as is the case when the natural gas line is extended  
20            into Addison County. Hence, the overall economic impact will be a multiple of  
21            these initial or direct effects. By utilizing an input-output model which traces the



1 linkages among the various sectors of the regional economy, the analyst arrives at  
2 an estimate of the multiple effects of the initial or direct effects. “Indirect” effects  
3 encompass the entirety of economic activity created in the economy through the  
4 ripple effects of these direct impacts. The availability of natural gas will change  
5 the economic structure and relationships between players in the economy. In turn  
6 these changes alter the structure of the economy going forward. The modeling  
7 answers the question: “What is the economic impact of making such a change  
8 after accounting for both the direct and indirect economic impacts as increases  
9 and decreases in economic activity play out through the linkages of the  
10 economy?” We estimated the Project impacts by use of regional economic  
11 models including the Regional Dynamics Inc. (“REDYN”) model and the REMI  
12 model maintained by Regional Modeling, Inc. Both of these models are dynamic,  
13 multi-regional, endogenous, input-output regional economic and demographic  
14 models based on the North American Industrial Classification System (“NAICS”).  
15 These models estimate a range of economic impacts of concern to this analysis  
16 expressed by such metrics as economic output, disposable personal income,  
17 household earnings, and employment,. Together the direct and indirect economic  
18 impacts quantify the economic impact upon the Vermont economy.  
19 In addition, since these economic costs and benefits are distributed over time, it is  
20 helpful to quantify the direct benefits (fuel bill savings) in present value terms.

1 We did this using a discount rate of 3.0%, based on the Board's conclusions in  
2 Board Order entered February 7, 2012.

3

4 Q9. What economic metrics do you utilize in measuring these direct and indirect  
5 effects within the economy?

6 A9. We report these economic changes through various metrics commonly used in  
7 economic impact analyses. Economic output represents the value of production  
8 by an economic sector. Disposable personal income is the amount of money for  
9 an individual or population to spend or save after taxes have been paid.

10 Household earnings are that portion of household income associated with wages  
11 and salaries and proprietor income due to employment. Employment is generally  
12 synonymous with jobs but is composed of both wage and salary workers and  
13 proprietors by location of their respective workplace.

14

15 Q10. How do these impacts differ from "direct" economic impacts?

16 A10. The direct economic impacts associated with the Addison County Natural Gas  
17 Project are the (a) construction and conversion capital expenditures of households  
18 and businesses; and (b) the availability of natural gas in Addison County. We  
19 estimate that the Addison County households, commercial businesses, and  
20 existing industrial energy consumers will reduce their collective energy bills by a  
21 total present value of \$210,000,000 (2012 dollars) over the 20-year period from

1           2011 through 2031. From this amount it is necessary to subtract customers'  
2           aggregate cost of converting from their present primary fuel source to natural gas.

3           We estimate conversion costs to be approximately \$189,000,000 (2012 dollars).

4           The net annual energy bill savings for each identified component of the economic  
5           analysis is an input to the input/output model as energy savings is a direct  
6           economic impact. Refer to Exhibit Petitioner JC-2(Rev)(5/30/13), Table 1Rev.

7

8   Q11.   So you estimate the capital cost of the transmission and distribution system, users'  
9           capital cost to convert to natural gas, and the energy bill savings for users net of  
10          conversion costs and you model those determinants to estimate the direct and  
11          indirect impact on the Vermont economy.

12   A11.   That is a correct summary of the process.

13

14   Q12.   Based upon your evaluation and analyses, will the Project provide an economic  
15          benefit to the state of Vermont and its residents?

16   A12.   Yes. I draw your attention to the tabulations attached as Exhibit Petitioner JC-  
17          2(Rev)(5/30/13), Table 1Rev. In addition to the \$210 M direct economic benefits  
18          (less conversion costs) the Project will provide the following additional indirect  
19          economic benefits:

20

21

1           **Construction Impacts:**

2           This \$90.1 million capital investment by Vermont Gas supports (1) various pre-  
3           construction activities including environmental assessments and mitigation  
4           actions, background studies for required permits, preliminary engineering and  
5           design, and right-of-way acquisitions and land purchases; (2) overall project  
6           management and construction contracting; and (3) transmission and distribution  
7           pipeline construction. Pre-construction activities focused on field investigations  
8           and background assessments in support of permit applications commenced in  
9           mid-2012. With approval of the required permits, right-of-way acquisitions and  
10          land purchases, along with construction and project engineering, are slated to  
11          begin in late 2013. Transmission pipeline construction commences in 2014 with  
12          distribution pipeline build-out to communities the following year. In addition to  
13          the VGS natural gas pipeline construction project, households and businesses will  
14          make capital expenditures for necessary equipment (e.g., furnaces, boilers,  
15          heaters) to switch to natural gas energy. In the course of bringing natural gas to  
16          Addison County, households and businesses will expend an estimated \$20.421.5  
17          million for needed equipment, which is net of the conversion incentives provided  
18          to households by VGS. The estimated cost of conversion is a conservative  
19          number. Household and business capital expenditures will begin in late 2014,  
20          peak in 2016 and continue modestly to 2031. While the economic benefits of  
21          construction are largely transitory, total statewide employment will peak at nearly

1 800 jobs in 2014; total annual output (in 2012 dollars) in Vermont will increase  
2 on average by \$4.67 million over the twenty-one-year period; disposable personal  
3 income and household earnings will annually increase on average by \$2.75  
4 million and \$2.32 million respectively during 2011-2031.

5  
6 **Household Impacts:**

7 The household sector is affected in two different and countervailing ways.  
8 Existing ratepayers within the current VGS service territory (in Chittenden and  
9 Franklin Counties) will be paying approximately \$4.4 million annually into the  
10 Fund. This amount represents an overall diminishment of disposable income for  
11 households affecting overall spending and savings behavior. Although  
12 households (i.e., “new customers”) in Addison County will also pay into the  
13 Fund, savings associated with switching from fuel oil and/or propane to natural  
14 gas will produce a net gain for these households’ total disposable personal  
15 income.

16  
17 **Substitution Impacts:**

18 We included the economic impact of consumers’ conversion costs and reduced  
19 demand for services from fuel oil and propane service companies. Households  
20 and businesses switching from fuel oil and propane to natural gas will have  
21 deleterious effects on fuel oil and propane service companies operating in

1 Vermont. Much of the negative economic impacts occur in the early mid to later  
2 years when the bulk of the households, most of the businesses, and all of the  
3 industrials will receive delivery of natural gas. In other words, the loss of sales  
4 for fuel oil and propane will cause employment losses within these companies.

5  
6 **Commercial Business/Industry Impacts:**

7 In terms of energy needs, the business and industry sector stands to experience  
8 significant savings from switching from fuel oil and propane to natural gas. Such  
9 savings are translated into additional jobs within the state of Vermont economy,  
10 boosted productive capacity (and increased competitiveness) for local businesses  
11 and industries, and increased disposable personal income for Vermonters. For  
12 instance, once the majority of the Addison County business/industry base is  
13 connected to natural gas, an estimated 230 jobs will be added each year to the  
14 Vermont economy.

15  
16 Our analysis is further summarized in Exhibit Petitioner JC-2(Rev)(5/30/13),  
17 Table 3Rev.

18  
19 In addition to the transitory benefits of construction and capital expenditures  
20 associated with bringing natural gas to Addison County, Vermont's businesses  
21 and households will be net beneficiaries over the 2011-2031 study period. On

1 average, more than 20 jobs will be ~~added~~lost each year to the state economy  
2 during the operations phase; however, due to the effects of construction, the  
3 average over the entire 2011-2031 period is an addition of approximately 20 jobs  
4 each year; economic output will increase annually by between ~~\$0.624~~ and  
5 ~~\$21.9144~~ million for a total increase of \$300.8 million; and disposable personal  
6 income will ~~change~~increase annually by between ~~-\$4.244~~ and ~~\$0.140~~ million  
7 after those years when initial conversions have been completed, for a total  
8 increase of \$8.1 million over the 2011-2031 period.  
9

10 Q13. Did you evaluate the economic impact of the Project under any alternate  
11 scenarios?

12 A13. Yes. As described in Mr. Lyons's testimony, recently, Vermont Gas has  
13 agreements in place with International Paper ("IP") to bring natural gas service to  
14 its mill in Ticonderoga, New York. Accordingly, our analysis was undertaken  
15 assuming service to IP and therefore no additional rate impact associated with the  
16 Project. However, we also ran a scenario whereby service to IP does not occur  
17 and therefore IP does not contribute to the cost of the Project. In that event, the  
18 Company estimates that the Project would require between a 2.6% and 4.5% rate  
19 increase in 2015. Accordingly we ran an economic scenario that included a 4.5%  
20 rate increase in 2015. The conclusion is the same: the Project results in

1 significant economic benefit to Vermont. The results of that alternative analysis  
2 are provided as Exhibit Petitioner JC-3(Rev)(5/30/13), Table 4Rev.

3  
4 **3. Conclusion**

5 Q14. Please summarize your conclusions regarding the economic impact to the  
6 Vermont economy.

7 A14. In both scenarios examined, the proposed Project provides a positive economic  
8 benefit to the economy of the state of Vermont as measured in present value terms  
9 in 2012 dollars. Additionally, I would like to point out that the proposed Project  
10 offers economic benefits that I am not able to quantify. Significantly, the  
11 proposed Project will improve the competitive advantage of Vermont businesses  
12 located in Addison County relative to other regions of the U.S. and enable the  
13 Vermont economy to be in a better position to take advantage of opportunities for  
14 economic growth in an increasingly competitive global marketplace.

15  
16 Q15. Does this conclude your testimony?

17 A15. Yes.