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Public Perception of the Oil and Gas Industry: The Good, the Bad, and the Ugly

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Abstract

Data collected in a general population survey from a random sample of individuals in Tarrant County, Texas, were used to empirically explore issues associated with public perception of the natural gas industry. In addition, the association of public perception of the energy industry with dependent measures such as individual-level actions that (a) may or may not have been taken and/or (b) may or may not be taken in response to the exploration and production of natural gas was investigated. Echoing findings from research in two neighboring Barnett Shale counties (Theodori 2009), it appears that members of the general public in Tarrant County distrust the intrusion of the gas industry and dislike certain potentially problematic social and/or environmental issues perceived to accompany development. Conversely, these same Tarrant County residents appreciate and view less negatively the economic and/or service-related benefits that tend to result from such development. Furthermore, the results of this study suggest that the social/environmental perceptual variable is a key factor to explaining past behaviors and predicting future behaviors taken in response to the exploration and production of natural gas. Possible implications of these findings for the energy industry are proposed.

Introduction

For the past nine years, the Gallup Organization has polled Americans on their views of more than 20 business and industry sectors in the country. The survey asks respondents to rate each business and industry sector in the United States on a five-point scale ranging from “very positive” to “very negative.” Between 2001 and 2009, the industries ranking near the top and bottom of the list remained fairly consistent. Either the computer industry or the restaurant industry topped the list as the most positively viewed industry sector each year (computer industry rated most favorably in 2001, 2002, 2003, 2004, 2008, and 2009; restaurant industry rated most favorably in 2005, 2006, and 2007) (Jones 2008, 2009; Newport 2007). Concurrently, with the exception of 2002, the oil and gas industry unfailingly ranked as the least positively viewed industry.

In 2001, the year of Gallup’s initial poll on the images of various business and industry sectors, roughly 24% of respondents viewed the oil and gas industry in a positive manner (either “somewhat positive” or “very positive”). That percentage increased by one percentage point in 2002. In 2003, the oil and gas industry had its highest rating, with 35% of respondents viewing it in a positive manner. One year later, that percentage dropped to 21, and in 2005 it dropped to 20. The percentage of respondents who rated the oil and gas industry positively in 2006, 2007, and 2008 were 15, 19, and 15, respectively. According to the most recent Gallup data (as of August 2009), approximately one in every five respondents (21%) regarded the oil and gas industry in a positive light (Jones 2009).

Over a span of numerous years now, the Gallup Organization and other national/international polling entities have produced extensive macro-level survey results on perceptual issues surrounding the oil and gas industry for the mass media (Bolsen and Cook 2008; Polling Report, Inc. 2009). Despite this vast knowledge on the perceptual issues surrounding the oil and gas industry, surprising little theoretical and/or empirical work has examined the effects of varying levels of public perception of the oil and gas industry on a dependent variable by incorporating public perception as the primary independent variable of interest. With the present research, we add to the scientific literature on public opinion of the energy industry. Specifically, public perception of the natural gas industry is investigated. Moreover, the association of public perception of the energy industry with dependent measures such as individual-level actions that (a) may or may not have been taken and/or (b) may or may not be taken in response to the exploration and production of natural gas is investigated.

Data

The data used for this paper were drawn from a 2009 study that focused on quality of life and energy production in Tarrant County, Texas. Tarrant County is a metropolitan county located in the core production zone of the gas shale basin known as the Barnett Shale. As of September 2001, there were 19 regular producing gas wells in Tarrant County (Railroad Commission of Texas 2001). Four years later, in September 2005, the number of regular producing gas wells in Tarrant County increased to 573 (Railroad Commission of Texas 2005). Between September of 2005 and February 2009, regular producing gas wells in Tarrant County increased by roughly 200% (n = 1,708) (Railroad Commission of Texas 2009).

Gas and oil well production data in Tarrant County from January 2001 through December 2009, as well as between January 2010 and April 2010, are reported in Table 1. Included in the table are figures for the amount of gas well natural gas (i.e., wells without completions for the production of oil), condensate (i.e., natural gas liquid recovered from gas wells from lease separators or field facilities), casinghead gas (i.e., natural gas produced along with crude oil from oil wells), and oil. As shown in Table 1, production of natural gas from gas wells in Tarrant County between 2001 and 2009 increased by approximately 16,652% (from 3,271,732 mcf to 548,090,638 mcf) (Railroad Commission of Texas 2010). Between January 1, 2010 and April 30, 2010, gas wells in Tarrant County produced 196,995,500 mcf of natural gas (Railroad Commission of Texas 2010).

Table 1—Production data from oil and gas wells in Tarrant County: 2001 through 2009 and January 2010 through April 2010

County	Time period	Gas well gas (mcf)	Condensate (bbl)	Casinghead (mcf)	Oil (bbl)
Tarrant	2001	3,271,732	58	0	0
	2002	17,884,104	465	0	0
	2003	40,529,629	2,115	0	0
	2004	75,283,248	3,124	0	0
	2005	123,642,479	5,278	0	0
	2006	183,672,082	14,967	0	0
	2007	281,023,780	43,219	0	0
	2008	464,399,110	56,659	0	0
	2009	548,090,638	42,685	0	0
	Total 2001 through 2009	1,737,796,802	168,570	0	0
	January 2010 through April 2010	196,995,500	14,320	0	0

Following a modified total design method (Dillman 1978), a survey questionnaire was delivered via the United States Postal Service to 450 randomly selected households in the county. In order to obtain a representative sample of individuals within residences, a response was requested from the adult in the household who most recently celebrated his/her birthday. The survey instrument, organized as a self-completion booklet, contained 42 questions and required approximately 60 minutes to complete. After the initial survey mail out, a post card reminder, and two follow-up survey mailings, a 34 percent response rate was achieved.¹

Perception of the Oil and Gas Industry

Measuring Perception of the Oil and Gas Industry. Perception of the oil and gas industry was assessed using a list of ten statements. Respondents were asked to indicate whether they “strongly agree,” “agree,” “disagree,” or “strongly disagree” with each of the following items:

- a. The natural gas industry is important to the local economy;
- b. Natural gas industry operators in Texas are too politically powerful;
- c. Not enough information concerning the development of natural gas is being made available to the general public;
- d. Even when carefully controlled, natural gas development is likely to upset the quality of life in a local area;
- e. Too little attention is being paid to the social costs of natural gas development;
- f. The natural gas companies have no compassion for our natural environment;
- g. Natural gas operators MUST adopt and use more environmentally friendly drilling practices;
- h. Natural gas companies will do only what’s required by law;
- i. Natural gas operators are drilling and producing too close to homes and businesses; and,
- j. In the long run, I’m sure that people in this area will be better off if our natural gas resources are developed.

¹ Eighteen of the 450 questionnaires were returned as undeliverable. None of the undeliverable household addresses were replaced with new ones. Hence, the final sample size was reduced to 432.

Response categories were coded so that higher values reflected more negative views of the oil and gas industry. Items “b” through “i,” which reflected less positive views of the oil and gas industry were coded as 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. Items “a” and “j,” which reflected more positive views of the oil and gas industry were reverse coded (1 = strongly agree; 4 = strongly disagree).

Maximum likelihood factor analysis using oblique rotation was conducted on these perceptual items to determine what, if any, underlying structures existed among them (Costello and Osborne 2005). The analysis produced a two-factor solution. After rotation, two of the ten items loaded on factor 1 (see Table 2). These items addressed the perceived economic aspects of natural gas development. Eight of the ten items loaded on factor 2. These measures addressed the perceived social/environmental aspects of the oil and gas industry in Texas. Factor 1 accounted for 28.43% of the total variance; factor 2 accounted for 22.12% of the total variance.

Table 2—Factor loadings for perception of the natural gas industry items

	Loading
Factor 1: Economic aspects of the natural gas industry	
The natural gas industry is important to the local economy.	0.52
In the long run, I'm sure that people in this area will be better off if our natural gas resources are developed.	0.99
Factor 2: Social and environmental aspects of the natural gas industry	
Natural gas industry operators in Texas are too politically powerful.	0.61
Not enough information concerning the development of natural gas is being made available to the general public.	0.63
Even when carefully controlled, natural gas development is likely to upset the quality of life in a local area.	0.63
Too little attention is being paid to the social costs of natural gas development.	0.67
The natural gas companies have no compassion for our natural environment.	0.67
Natural gas operators MUST adopt and use more environmentally friendly drilling practices.	0.51
Natural gas companies will do only what's required by law.	0.64
Natural gas operators are drilling and producing too close to homes and businesses.	0.80

The two economic items and the eight social/environmental perceptual items were ranked in decreasing order according to mean score (see Table 3). As noted, each of the mean scores for the items comprising the social/environmental factor, as well as the overall mean score for that factor, was higher than the mean score for the two economic items and the overall mean economic score. This indicated that, overall, members of the general public in Tarrant County, Texas, viewed the items on social/environmental factor less positively than the items on the economic factor.

Table 3—Mean scores for perception of the natural gas industry items

	Mean Score
Factor 1: Economic aspects of the natural gas industry	
In the long run, I'm sure that people in this area will be better off if our natural gas resources are developed.	1.98
The natural gas industry is important to the local economy.	1.72
Overall mean – factor 1	1.84
Factor 2: Social and environmental aspects of the natural gas industry	
Natural gas operators MUST adopt and use more environmentally friendly drilling practices.	3.16
Natural gas companies will do only what's required by law.	2.94
Not enough information concerning the development of natural gas is being made available to the general public.	2.81
Natural gas industry operators in Texas are too politically powerful.	2.75
Natural gas operators are drilling and producing too close to homes and businesses.	2.74
Too little attention is being paid to the social costs of natural gas development.	2.64
The natural gas companies have no compassion for our natural environment.	2.44
Even when carefully controlled, natural gas development is likely to upset the quality of life in a local area.	2.43
Overall mean – factor 2	2.75

Association of the Oil and Gas Industry and Individual-Level Actions. In the study, respondents were asked to indicate (1) whether or not they engaged in certain individual-level actions as a response to the exploration and production of natural gas and (2) their likelihood of engaging in such actions in the future. First, respondents were asked whether or not they had ever: (a) attended a public meeting to get information and learn more about the drilling and production of natural gas; (b) contacted a local elected official or governmental agency to complain about a natural gas drilling and/or production issue; (c) voted FOR a political candidate because of his/her favorable position on the drilling and/or production of natural gas; and (d) voted AGAINST a political candidate because of his/her favorable position on the drilling and/or production of natural gas. Each individual-level action was dummy coded (1 = yes; 0 = no). Next, respondents were asked to indicate their likelihood of engaging in these same four actions in the future. The likelihood of engagement for each item was dummy coded (1 = likely; 0 = not likely).

The association of public perception of the energy industry with individual-level actions that (1) may or may not have been taken in response to the exploration and production of natural gas and (2) may or may not be taken in response to the

exploration and production of natural gas was assessed using multivariate logistic regression techniques. Net odds ratios for the effects of public perception on individual-level actions that may or may not have been taken in response to the exploration and production of natural gas are reported in Table 4.^{2,3} Net odds ratios for the effects of public perception on individual-level actions that may or may not be taken in response to the exploration and production of natural gas are reported in Table 5.

As shown in Table 4, individuals with more positive views on the economic factor and those with more negative views on the social/environmental factor were more likely than their respective counterparts to have attended a public meeting to get information and learn more about the drilling and production of natural gas. Individuals with more negative views on the social/environmental factor were more likely than their counterparts to have contacted a local elected official or governmental agency to complain about a natural gas drilling and/or production issue. Moreover, such individuals were more likely to have voted against a political candidate because of his/her favorable position on the drilling and/or production of natural gas. Individuals with more positive views on the social/environmental factor were more likely to have voted for a political candidate because of his/her favorable position on the drilling and/or production of natural gas.

Table 4—Net odds ratios for the effects of public perception on individual-level actions that may or may not have been taken in response to the exploration and production of natural gas

	Multivariate Odds Ratios ^a
Attended a public meeting to get information and learn more about the drilling and production of natural gas.	
Economic factor	0.31*
Social/environmental factor	2.71*
Contacted a local elected official or governmental agency to complain about a natural gas drilling and/or production issue.	
Economic factor	0.71
Social/environmental factor	35.16**
Voted FOR a political candidate because of his/her favorable position on the drilling and/or production of natural gas.	
Economic factor	0.46
Social/environmental factor	0.12*
Voted AGAINST a political candidate because of his/her favorable position on the drilling and/or production of natural gas.	
Economic factor	5.29
Social/environmental factor	17.53*

^a Odds ratios computed controlling for mineral rights ownership, personal/familial ties to the natural gas industry, and length of residence in the county.

* $p \leq 0.05$; ** $p \leq 0.01$.

As shown in Table 5, individuals with increasingly negative views on the social/environmental factor indicated that they would be more likely than their counterparts to contact a local elected official or governmental agency to complain about a natural gas drilling and/or production issue in the future. Such respondents also indicated that they would be more likely to vote against a political candidate because of his/her favorable position on the drilling and/or production of natural gas.

² An odds ratio (θ) is e (natural logarithm) raised to the power of “b” (the metric logit coefficient); θ refers to the effect of a one-unit change in X on the odds of Y . It has a “times as likely” interpretation and θ can equal any nonnegative number. When X and Y are independent, θ equals 1. A value of 1 generally serves as a baseline for comparison. Odds ratios on either side of 1 reflect certain types of associations. An odds ratio greater than 1 ($1 < \theta < \infty$) indicates a positive association, while an odds ratio less than 1 ($0 < \theta < 1$) denotes a negative association. Values of θ farther from 1 in either direction designate stronger levels of association (Agresti 1996; Liao 1994).

³ Following Theodori (2008), three variables – mineral rights ownership, personal/familial ties to the natural gas industry, and length of residence in the county – were included in this research as control factors. Mineral rights ownership (0 = does not own mineral rights; 1 = owns mineral rights) and personal/familial ties to the natural gas industry (0 = respondent and/or family members not employed either part-time or full-time in an occupation related to the natural gas industry; 1 = respondent and/or family members employed either part-time or full-time in an occupation related to the natural gas industry) were both dummy coded. Length of residence in the county was measured in years.

Table 5—Net odds ratios for the effects of public perception on individual-level actions that may or may not be taken in response to the exploration and production of natural gas

	Multivariate Odds Ratios ^a
Attend a public meeting to get information and learn more about the drilling and production of natural gas.	
Economic factor	1.08
Social/environmental factor	2.39
Contact a local elected official or governmental agency to complain about a natural gas drilling and/or production issue.	
Economic factor	0.97
Social/environmental factor	6.68***
Vote FOR a political candidate because of his/her favorable position on the drilling and/or production of natural gas.	
Economic factor	0.65
Social/environmental factor	0.82
Vote AGAINST a political candidate because of his/her favorable position on the drilling and/or production of natural gas.	
Economic factor	1.88
Social/environmental factor	3.28*

^a Odds ratios computed controlling for mineral rights ownership, personal/familial ties to the natural gas industry, and length of residence in the county.

* $p \leq 0.05$; *** $p \leq 0.001$.

Concluding Comments

Two primary conclusions can be drawn from this research. First, it appears that in Tarrant County, Texas, as well as in other Barnett Shale counties (Theodori 2009), members of the general public distrust the intrusion of the gas industry and dislike certain potentially problematic social and/or environmental issues perceived to accompany development. Conversely, the majority of citizens appreciates and views less negatively the economic and/or service-related benefits that tend to result from such development (Theodori 2009). Second, it appears that the social/environmental perceptual variable is a key factor to explaining past behaviors and predicting future behaviors taken in response to the exploration and production of natural gas.

Based upon the results of this study, certain recommendations can be posed to the energy industry. With respect to the first finding, the energy industry must do a better job of recognizing and addressing earnestly the perceived negative social and environmental consequences associated with development. Concomitantly, the energy industry must do a better job of educating the general public about its low-impact technologies and other environmentally friendly drilling systems which substantially reduce adverse impacts in the social and environmental arenas (Haut et al. 2009). Funding and promoting informational and educational programs at the local level on the advances in environmentally friendly drilling practices may be an effective strategy for operators to address some of the public (mis)perceptions about the energy industry.

With respect to the second finding, transparent communication between the energy industry and all pertinent stakeholders is paramount. The energy industry must inform local residents about the potentially negative social and environmental consequences of energy development in and around their communities. At the same time, community leaders, government and regulatory agencies, environmental organizations, and other stakeholders must effectively communicate their perceived social and environmental fears and/or anxieties associated with unconventional gas development to each other and, in turn, to industry. Open and honest communication will reduce the spread of rumors and inaccuracies about perceived negative social and environmental consequences of current activities and proposed developments at the local level. Furthermore, county and municipal leaders must communicate the social and environmental concerns of their constituents to industry and work with them to minimize the negative “objective” social and environmental aspects of the unconventional gas recovery process. As research and practice can attest, attitudes and behaviors often change.

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