

# Would You Pay to Reduce Risks from Shale Gas Development? Public Attitudes in Pennsylvania and Texas

*A new survey brings an important stakeholder—the public—into the policy debate over shale gas development. **Alan J. Krupnick** and **Juha Siikamäki** report the surprising results.*

**I**n 2011, RFF's Center for Energy Economics and Policy (CEEP) launched an initiative to conduct an independent, broad assessment of the environmental risks associated with the shale gas development process. One key part of that project—our survey of experts from government agencies,

industry, academia, and nongovernmental organizations—elicited rich information on the views of experts about understanding and prioritizing risks associated with shale gas development. However, the general public, which is an important stakeholder in the policy debate, may not be aware of experts' opinions or agree with them. To

help better understand public opinion and bring it into the policy debate, researchers at CEEP conducted a survey involving random sampling of the adult populations of Pennsylvania and Texas. The survey was designed to answer several questions:

- » How much does the public know about shale gas development and fracking?
- » How much does the public support shale gas development?
- » How concerned is the public about the associated environmental and health risks?
- » How much is the public willing to pay to reduce those risks?
- » How does the type of information that people receive about shale gas development and its risks affect their beliefs and support?

By asking about participants' knowledge about the shale gas development process and risks, we hoped to determine how such knowledge affects support. We also experimented with giving survey respondents one of three different information "treatments" about the risks of shale gas development, to examine how malleable attitudes are in general and with respect to the type of information provided. Besides helping understand what drives public opinion, this information could facilitate development of improved communication and public education strategies.

Given the extensive oil and gas development in Texas relative to Pennsylvania, the former's dependence on the industry for much of its economic development, and the political differences between the two states, we might expect that Pennsylvanians would be less supportive of shale gas development than Texans, and that they would be willing to pay more to reduce environmental risks, all other things equal.

Contrary to this expectation, we found that a majority of people in both states support shale gas development—despite

their serious concerns about potential damages—and that they are generally willing to pay similar amounts to reduce risks to the environment.

### **About the Survey**

We conducted an online survey of 1,716 adults drawn from a randomly selected panel, representative of adult Pennsylvanians and Texans. First, respondents were asked about their knowledge of shale gas development. Then they received an explanation of the process. Next, we gauged their attitudes toward shale gas development and the risks. The participants were provided one of three alternative descriptions of the risks—one from the website of the American Petroleum Institute (API), another from websites of several environmental organizations, and a neutral description written by RFF researchers designed to be the "rational middle."

To elicit willingness to pay, we asked respondents to vote for potential government programs to reduce risks to groundwater, surface water, air pollution, community disruption, and habitat fragmentation. The survey explained to respondents that mitigating risks will be costly, and these costs will result in higher natural gas and electricity prices.

In the voting questions, respondents could vote for one of two optional risk-reduction programs, each with specified costs and risk reductions, or select the status quo without a new risk-reduction program or additional cost to the household. Each respondent went through a series of such voting questions. By asking respondents about different environmental risk reductions and program costs, we could identify willingness to pay for specific types of risk reductions.

The voting questions required that we describe current environmental risks as

a baseline. But because the actual levels of risk have not yet been conclusively determined, the survey varied these risks across respondents, examining the public's preferences under low, medium, and high baseline risks.

Toward the end of the survey, respondents' attitudes toward risks and shale gas development were reengaged to assess whether the information they were given in the survey affected their attitudes. Finally, participants were given a long list of debriefing questions to gauge whether they understood the survey, accepted it as real and unbiased, and interpreted the questions using logic we intended.

### Attitudes toward Shale Gas Development and Risks

By and large, the survey responses indicate that a considerable fraction of the general public in both states is concerned about the environmental risks associated with shale gas development. Groundwater and surface water risks generated the most

concern; 41 and 34 percent of all respondents said they are extremely concerned or very concerned about these two risks, respectively. In contrast, only 14 and 19 percent responded that they are not at all concerned or only minimally concerned.

However, despite these worries, there is also a surprisingly broad base of support for shale gas development. Fifty-nine percent of the respondents said they are supportive, while only 20 percent are against development (leaving 11 percent indifferent and 10 percent responding that they have no opinion or don't know). This distribution of support differs little across the two states, although Texans have a more positive view (Figure 1).

Taking these two findings together, we concluded that the public in these two very different states is generally supportive of sustainable shale gas development.

### Willingness to Pay to Reduce Risk

As all economists know, attitudes are one thing and willingness to pay is another.

Figure 1. Public Support for Shale Gas Development

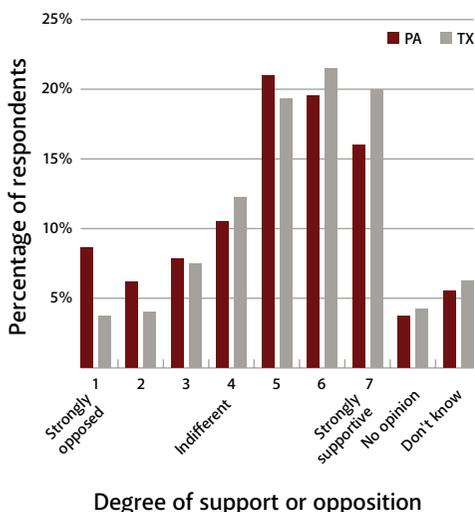
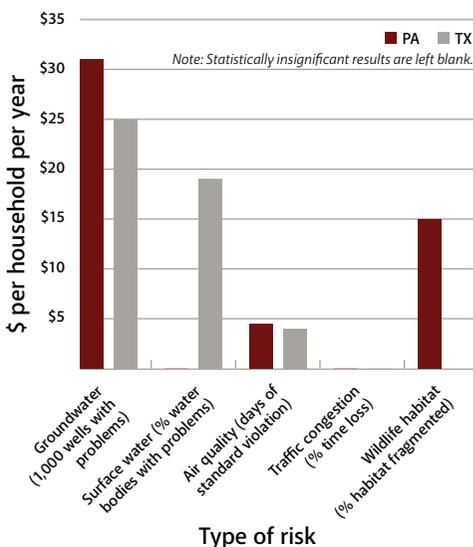


Figure 2. Willingness to Pay, on Average, for Shale Gas Risk Reductions





Just because the survey respondents are concerned about the environmental risks of shale gas development doesn't mean that they will be willing (or able) to pay.

However, we found that the survey respondents in both states are clearly willing to pay to reduce risks (Figure 2). For instance, on average, their willingness to pay per household per year falls approximately as follows:

- » \$25 to \$30 to eliminate problems with 1,000 drinking water wells,
- » \$20 in Texas to eliminate problems in 1 percent of surface water bodies with problems, and
- » \$15 in Pennsylvania to reduce 1 percent of habitat fragmented.

Reducing risks to air quality (reduced days of violations of the National Ambient Air Quality Standards) also generates a willingness to pay, on average about \$4 per day of violation reduced in both states. Neither Texans nor Pennsylvanians are willing to pay to reduce time lost from increased truck traffic and road congestion, possibly because the population-weighted sample primarily includes urban dwellers, or possibly because these aspects of community effects are viewed as unimportant. In Pennsylvania, we found that although willingness to pay, on average, for reduced surface water risks is not statistically different from zero, a portion of the

general public is willing to pay to avoid those risks. The same is true for habitat fragmentation in Texas.

These results are averaged over different risk baselines. In designing the study, we had two countering hypotheses—that lower baselines give respondents the impression that the problem is not that severe and makes them less willing to pay for further risk reductions, or that because a given absolute reduction in risk is larger in percentage terms for a lower baseline, people are willing to pay more for a given change when the baseline is lower. We found weak support for the latter hypothesis but conclude that generally, willingness to pay on a per-unit basis (for example, per 1,000 drinking water wells, or 1 percent of surface water bodies) is not sensitive to the risk baseline.

### The Role of Information

The findings above use the RFF neutral risk information as reference and control for the two other explanations of risks from

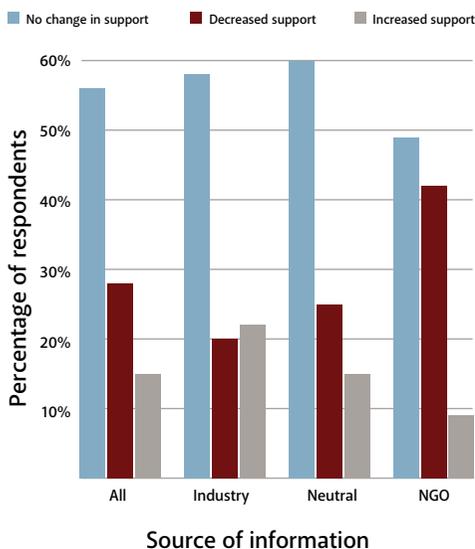
the API and environmental organizations. An examination of the willingness-to-pay estimates by each explanation revealed that the effect of risk information depends, in part, on whether the respondent holds a predisposed attitude toward supporting or opposing shale gas development. For those with such opinions already formulated, risk information affects willingness to pay as expected: API information reduces willingness to pay for risk reductions, whereas the NGO information increases it. For the small fraction of the sample not holding a preexisting view about shale gas development, the results are more difficult to interpret, and the effects of the treatments may even reverse.

The different risk explanations also influenced stated support for shale gas development (Figure 3). We hypothesized that RFF’s neutral information would be least effective in changing attitudes, that the API information would increase support for shale gas development, and that the environmental groups’ information would reduce support.

Only the last of these hypotheses was borne out: the environmental groups’ information is three times more likely to erode support as increase it. Although information provided by industry changes attitudes as well, it is as likely to lose supporters as increase support. Our neutral information induces a bit more opposition and a bit less support than that of industry.

The results suggest that industry has a communications problem. Unfortunately, careful examination does not reveal any characteristics that differentiate the people who become less supportive in response to the industry script from those who become more supportive, as industry intended. The only robust finding we can make is a very general one: people who are unfamiliar with fracking and other terms associated

**Figure 3. How Different Information Affects Support for Shale Gas Development**



with shale gas development are more likely to be moved by the information we provide them, irrespective of the source.

### **Implications for Regulation and Messaging**

The public in two very different states is supportive of sustainable shale gas development and willing to pay, through higher natural gas prices, to reduce some of the risks that sustainability implies. The government can use this information to examine how stringent its regulations should be by comparing these monetary benefits of risk reductions as the public sees them to regulatory costs.

In spite of the enormous flow of messages, news stories, blog posts, reports, and the like, most of the public is largely ignorant of the details of shale gas development and the risks it might impose. Therefore, their beliefs and preferences may be malleable. Our findings suggest

that environmental NGOs have been more successful than industry in persuading the public of their views. Ultimately, industry and environmental groups need to get better at communicating accurate information. For this to happen, experts need to agree on what the risks of shale gas development actually are, and this will require more and better research. Until this happens shale gas development will continue to be an example of social polarization. ●

#### FURTHER READING

- Krupnick, Alan. 2013. *Managing the Risks of Shale Gas. Key Findings and Further Research*. Washington, DC: RFF.
- Krupnick, Alan, Hal Gordon, and Sheila Olmstead. 2013. *Pathways to Dialogue: What Experts Say about the Environmental Risks of Shale Gas Development*. Washington, DC: RFF.
- Olmstead, Sheila, Lucija A. Muehlenbachs, Jhih-Shyang Shih, Ziyang Chu, and Alan J. Krupnick. 2013. Shale Gas Development Impacts on Surface Quality in Pennsylvania. *Proceedings of the National Academy of Sciences* 110(13): 4855–4856.

### **What Respondent Characteristics Drive Support or Opposition?**

Because the survey collects demographic and other personal information, it is possible to understand how individual characteristics drive attitudes on shale gas development. This understanding can help target public education and communication, and may even help target regulations that address grievances of specific groups.

We collected demographic data, such as respondent's age, income, gender, and so forth. Looking at each variable, we found that men, older people, political conservatives, non-Hispanics, middle-income earners with an annual salary of \$50,000–\$70,000, and those who lease land for shale development are more likely to support shale gas development. We saw no effect associated with race, unemployment, familiarity with fracking, or higher earnings, and we found that support is significantly driven by political conservatism.

For Pennsylvania, we also have information about where the respondent lives. Using data on shale gas well locations, we examined geographic designation, distance of home from the nearest well, and the well density within a certain radius from the home. Our most robust finding is that respondents who live in Philadelphia or Pittsburgh are less supportive of shale gas development than the rest of the state, even when political views are held constant.