

A Summary Report of a 2017 Survey of the Politics of Oil and Gas Development Using Hydraulic Fracturing in Colorado

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Questions and Comments

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Objective

This report summarizes the results of a 2017 survey designed to gather perceptions of people actively involved in oil and gas development that uses hydraulic fracturing in Colorado from a diverse range of sectors and interests. The primary objective of the survey was to help understand policy issues and debates surrounding this issue, as part of an ongoing study conducted through the School of Public Affairs at the University of Colorado Denver.¹ Funding for the survey was provided by the National Science Foundation.²

Methods

The survey was administered by email through Qualtrics, an online survey platform. The survey population included 551 individuals actively involved or knowledgeable about oil and gas development in Colorado. These individuals were identified using a purposive sampling approach based on evidence in media reports, online reports, public hearings and testimony, and recommendations from interviews.³ This survey follows two previous waves of the survey done in 2013 and 2015. The population of individuals in the sample are affiliated with multiple levels of government, industry, non-profits, citizen-based organizations, academia, consulting, and the media. The survey response period was thirteen weeks, from January 30, 2017 through April 30, 2017, and three reminders were sent.

To understand the policy debates around oil and gas development in Colorado, the survey questions measured the following: respondents' policy positions on the issue; perceptions of problems and benefits related to oil and gas development; perceived levels of contentiousness of the policy debate; interactions and political activities among individuals involved; satisfaction with policy processes; and perceived environmental, economic, and political outcomes. Additionally, questions were included to gauge respondents' levels of experience with different aspects of oil and gas development, their education, and political leanings. The appendix to this report presents the summary statistics for the responses to each of the questions on the survey, including mean responses and standard deviations for questions with numeric or

¹ This study was approved by the Colorado Multiple Institute Review Board. Participation was entirely voluntary and individually identifiable information of the respondents is not presented nor published.

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³ The initial target list of respondents was 667 individuals. After eliminating bounced emails from the list and individuals who were not actively involved in the issue, the final population was 551.

ordinal response categories, and the frequency and percentage of responses for questions with nominal response categories. Below, we highlight key findings from the survey and reference the survey question number associated with those results, as listed in the appendix. *Please refer to the appendix for all summary statistics of the results.*

Key Findings

General Description of Respondents: 186 people responded to the survey, yielding a 34% response rate.⁴ Not all respondents chose to answer every question, so response rates vary by question. As this is not a public opinion survey, it is important to note that survey respondents reported that the oil and gas development is a relatively high priority professionally or personally (*see Q21*) and they are moderately experienced with many aspects of the issue (*see Q22*). However, there is variance in the levels of experience. Most respondents reported that they are relatively well experienced in researching, reading, and analyzing issues related to hydraulic fracturing, but few respondents are experienced with direct contact with oil and gas operations, such as living near a well site or owing mineral or surface rights. Most respondents reported high levels of formal education (*see Q20*), with almost 90% of respondents reporting at least a Bachelor's degree or higher. Finally, the spread of respondents' political ideology is evenly spread between liberal and conservative; only 8% of respondents reported either an extremely conservative or extremely liberal political stance (*see Q19*). Liberals and conservatives responded in nearly equal measure while moderate political position was the most dominant.

Positions: The positions reported by respondents on the issue of oil and gas development using hydraulic fracturing vary (*see Q3*).

- Responses were skewed towards limiting or stopping oil and gas development that uses hydraulic fracturing with about 27% of respondents reporting that they would like to see development continued at the current rate. One third of respondents would like to see development expanded either moderately or extensively, but more than 40% of

⁴ The response rates by organizational affiliation are: Environmental or Conservation Groups (14 of 58 = 24%), Consulting Firms or Think Tanks (8 of 27 = 30%), Federal Government (2 of 25 = 1%), Oil and Gas Industry (32 of 86 = 37%), Oil and Gas Professional Associations (2 of 6 = 33%), Universities or Colleges (17 of 34 = 50%), Organized Citizen Groups (16 of 24 = 67%), Local Government (77 of 230 = 33%), and State Government (17 of 45 = 38%), and Other (1 of 16 = 1%).

respondents would like to see development either stopped or limited.

- More than 20% of the respondents held extreme positions on development of either stop entirely (10.2%) or expand extensively (12.1%).
- It appears that quality scientific evidence may be influential in impacting positions of respondents regarding oil and gas development that uses hydraulic fracturing. When respondents were given circumstances under which they would be willing to expand oil and gas development that uses hydraulic fracturing (*see Q7*), the most convincing argument was if convincing scientific evidence showed it is completely safe to the environment or public health, followed by convincing scientific evidence showing it boosts the economy. The least convincing argument was when a majority of Coloradans supported expansion. Relatedly, when respondents were given circumstances under which they would support government decisions to limit or stop oil and gas development that uses hydraulic fracturing (*see Q8*), the most convincing scenario was again if scientific evidence shows it is a significant threat to the environment or public health, followed by evidence showing that it hurts the economy. Note: averages include those respondents who already may support expansion or limiting/stopping production.

Problem Perceptions: On average, respondents agreed that there are both benefits (*see Q1*) and problems (*see Q2*) associated with oil and gas development using hydraulic fracturing. The standard deviations of the scores suggest that there is substantial variance in the opinions on the various benefits and problems associated with oil and gas development. Additionally, respondents were asked if their perceptions of the benefits and risks have changed over time (*see Q11 and Q12*).

- The benefit with the highest level of agreement is the increase in government revenue that comes from oil and gas operations, followed closely by national security and job creation. Decrease in greenhouse gases as a benefit of oil and gas development that uses hydraulic fracturing was the least agreed upon benefit.
- The problem with the highest level of agreement is the nuisance to the general public caused by truck traffic, noise, and light from well operations, followed closely by the boom-and-bust economic cycles from natural gas development and degradation of air quality. Respondents were least concerned about public health impacts from exposure to drilling operations.
- When asked whether they have become more or less convinced about the benefits and risks (*see Q10 and Q11*), respondents answered in nearly equal measure across categories. About 38% reported becoming more convinced about the benefits, with 35% stating that their views have not changed, and 27% that they have become less convinced of the benefits. Similarly, 36% reported that they have become more

convinced about the risks, 38% indicated that their views haven't changed, and 26% that they have become less convinced of the risks.

Level of Government for Regulation: In asking about preferences for which level of government, if any, should regulate various issues associated with oil and gas development (see Q4), we find the following notable patterns.

- Respondents rarely prefer no regulation on an issue. When it was preferred, no regulation never exceeded about 4% of respondents on a given issue.
- With only one exception, the state was the most preferred regulator. For mitigating public nuisances caused by truck traffic, noise, and light from well site operations, respondents were split evenly among municipal, county, and state government as the preferred regulator.
- Respondents heavily favored state government over any other levels of government for handling reclamation of old well sites disposing or treating produced water.
- The federal government was never the most preferred level of government for handling issues, although around one-third of respondents felt that the federal government should regulate air emissions (27.38%) and disclosure of fluids (32.93%).

Political Contentiousness: In exploring the contentiousness of the issue, two points emerge:

- Over 95% of respondents reported that the issue of oil and gas development using hydraulic fracturing was just as contentious, more contentious, or far more contentious of an issue than other political issues in Colorado (see Q5).
- On average, respondents reported a moderate level of agreement when asked if the views of people they disagree with threaten them personally or professionally (see Q6). Respondents, on average, were even more certain that the views of people they disagree with threaten Colorado.

Interactions and Political Activities: Respondents reported a diversity of interactions with various entities that are important in achieving personal or professional goals related to oil and gas development that uses hydraulic fracturing.

- The most important types of interactions were, in descending order, with the state government, county government, oil and gas industry, city government, and federal government (see Q9). Interactions with organized citizen groups, environmental or conservation groups, and agricultural organizations were moderately important. The least important interactions were with consulting firms or think tanks and churches or other religious organizations.
- Respondents reported that their relationships with those they disagree with are

somewhat collegial (*see Q12*), and their relationships with those they agree with were more collegial, on average (*see Q13*).

- Providing information to government officials was most effective in meeting respondents' goals related to oil and gas development, countering arguments made by people you disagree with was much less effective (*see Q18*). Other activities perceived as effective were coordinating political activities with allies and brokering agreements between parties.

Viability of Policy Processes: The survey included questions to assess whether current policy processes are capable of addressing the political debates associated with oil and gas development.

- Just over half of respondents noted that there are organizations or individuals who have the authority and trust to help negotiate policy solutions to oil and gas issues in the United States (*see Q14a*).
- In inquiring about the venues that are most viable for addressing personal or professional goals for oil and gas development that uses hydraulic fracturing, respondents reported that general elections of government officials were most viable, while public referenda were least viable (*see Q15*). However, we find substantial variance in perceptions of public referenda as a viable venue.

Perceived Outcomes: The survey included a question to gauge perceptions of how various economic, political, and environmental issues related to oil and gas development have either improved or deteriorated in the last two years (*see Q17*).

- Although responses to this question varied widely, on average, respondents ranked most issues as "about the same" (or 0 on a scale of -2 to +2). Yet there was a tendency to rank more of the issues as slightly "worse" than "better".
- The issue where respondents have seen the most improvement – by far – was the availability of scientific information; however, the average improvement in quality was still modest at 0.43.
- The other issues that respondents, on average, ranked as showing slight improvement included the greenhouse gas emissions, protection of the environment and public health, and environmental impacts and safety of hydraulic fracturing operations.
- Respondents perceived the intensity of the public debate, followed closely by communication by the media, as having seen the biggest deterioration in the past two years. Other notable deteriorations were the consideration of vulnerable populations in political decision making, relations between state and local governments, and public

trust in the Colorado Oil and Gas Conservation Commission (COGCC).

- In an open-ended question, respondents offered a variety of recommendations (*see Q23*) for improving the processes, policies, and outcomes regarding oil and gas development that uses hydraulic fracturing in Colorado such as media education, increased opportunities for public input, open and honest communication, and focusing on the facts.

Conclusions and Next Steps

The results of this study provide insights on the opinions and perceptions of individuals in Colorado who are actively involved in or knowledgeable about oil and gas development using hydraulic fracturing. The results of this 2017 survey show many similarities to findings from surveys we conducted in 2013 and 2015 on this issue. As with our previous surveys, the individual respondents represent an array of public, private, and non-profit organizations. We found general agreement that oil and gas development poses both benefits and risks and while there was generally consensus that the state should be the preferred regulator, there was variance across our sample in those perceptions. Generally, respondents' positions on whether to limit or expand hydraulic fracturing were set, but they reported a willingness to change their positions with convincing scientific evidence. There was also widespread recognition of the high level of contentiousness of this issue politically, particularly as it impacts the state of Colorado, along with active efforts to impact the politics and policy outcomes. While the respondents to our survey identified several viable venues to shape politics in the state, nearly half of respondents felt that Colorado lacked leaders to negotiate policy solutions.

In the coming months, additional data analyses will be conducted to examine and test theory and to explore bivariate and multivariate relationships among the variables. We will also be comparing results from this survey more directly with the results from 2013 and 2015 surveys in Colorado using similar questions. These additional analyses will be made available upon completion, with results posted on the Workshop on Policy Process Research website at the University of Colorado Denver's School of Public Affairs.

Appendix: Survey Questions and Statistics

Q1 To what extent do you agree or disagree that the following are potential benefits of oil and gas development that uses hydraulic fracturing? *(On a scale of 1 to 5: 1 = strongly disagree; 5 = strongly agree)*

N = 171	Mean Level of Agreement	Standard Deviation
National energy security	3.88	1.26
Job creation	3.82	1.17
Increase in government revenue through severance, property, and sales taxes	3.93	1.04
A bridge toward renewable energy sources from the natural gas produced	3.26	1.29
Fuel switching from coal to natural gas	3.63	1.13
Reduction of energy costs	3.41	1.19
Decrease in greenhouse gases	2.87	1.78

Q2 To what extent do you agree or disagree that the following are potential problems related to oil and gas development that uses hydraulic fracturing? *(On a scale of 1 to 5: 1 = strongly disagree; 5 = strongly agree)*

N = 171	Mean Level of Agreement	Standard Deviation
Insufficient capacity by federal agencies for regulation	3.25	1.39
Boom-and-bust economic cycles from natural gas development	3.79	1.94
Contamination of ground and surface water supplies	3.10	1.38
Degradation of air quality	3.43	1.39
Nuisance to the general public caused by truck traffic, noise, and light from well operations	3.81	1.13
Competition over available water supplies	3.33	1.37
Increase in greenhouse gases	3.32	1.31
Public health impacts from exposure to drilling operations	3.03	1.92

Q3 Please indicate what comes closest to your current position in relation to oil and gas development that uses hydraulic fracturing. It should be...

N = 157	Frequency of Responses	Percent of Responses
Stopped	16	10.2%
Limited	49	31.2%
Continued at current rate	42	26.8%
Expanded moderately	31	19.7%
Expanded extensively	19	12.1%

Q4 If you were to choose between no regulation or one level of government to regulate the following issues related to oil and gas development that uses hydraulic fracturing, which would you choose?

N = 168*	No regulation	Municipal government	County government	State government	Federal government
Water quality	0%	8.33%	7.74%	64.88%	19.05%
Air emissions	0%	4.17%	8.33%	60.12%	27.38%
Disclosure of chemicals in hydraulic fracturing fluids	1.80%	1.80%	7.19%	56.29%	32.93%
Setbacks of wells from occupied buildings or natural features	1.20%	20.96%	30.54%	42.51%	4.79%
Location of the wellhead	1.80%	23.35%	21.56%	49.70%	3.59%
Reclamation of old well sites	0%	4.24%	8.48%	78.79%	8.48%
Responding to accidents at the well site	0%	14.55%	21.82%	60.00%	3.64%
Water supply	4.22%	15.66%	14.46%	60.84%	4.82%
Disposing or treating produced water	0%	7.83%	8.43%	68.67%	15.06%
Mitigating public nuisances caused by truck traffic, noise, and light from well site operations	1.81%	29.52%	39.16%	27.11%	2.41%
Safety of well operators at the well site	1.81%	1.81%	9.04%	51.20%	36.14%

***Frequency of responses per category not shown for ease of readability of the table.**

Q5 Many political issues in a democracy can be characterized as contentious. Compared to other political issues in Colorado, the level of political contention about oil and gas development using hydraulic fracturing in Colorado is...

N = 163	Frequency of Responses	Percent of Responses
Far less contentious	1	0.61%
Less contentious	6	3.68%
Just as contentious	46	28.22%
More contentious	70	42.94%
Far more contentious	40	24.54%

Q6 Do the views and actions of those you disagree with on oil and gas development that uses hydraulic fracturing...

N = 167	Mean Level of Threat	Standard Deviation
Threaten you personally or professionally (e.g., your job, values, income, or quality of life)? <i>(On a scale of 1 to 5: 1 = not at all; 5 = a great deal)</i>	2.84	1.28
Threaten the state of Colorado? <i>(On a scale of 1 to 5: 1 = not at all; 5 = a great deal)</i>	3.52	1.12

Q7 Please indicate the extent that you agree or disagree with the following statements.

I would support government decisions that would significantly EXPAND oil and gas development that uses hydraulic fracturing in Colorado if... (On a scale of 1 to 5: 1 = strongly disagree; 5 = strongly agree)

N = 163	Mean Level of Agreement	Standard Deviation
Convincing scientific evidence shows it is completely safe to the environment or public health	3.38	1.22
Convincing scientific evidence shows it boosts the economy	3.07	1.27
Colorado regulators passed and enforced stricter regulations	2.80	1.15
The state provides more authority to local government	2.75	1.33
A majority of Coloradans support its expansion	2.58	1.08
Colorado adopted an energy plan that included a transition away from all fossil fuels	2.70	1.29

Q8 I would support government decisions that would LIMIT or STOP oil and gas development that uses hydraulic fracturing in Colorado if...(On a scale of 1 to 5: 1 = strongly disagree; 5 = strongly agree)

N = 162	Mean Level of Agreement	Standard Deviation
Convincing scientific evidence shows it is a significant threat to the environment or public health	3.63	1.28
Convincing scientific evidence shows it hurts the economy	3.20	1.17
A majority of Coloradans support a ban	2.59	1.27
Mineral right owners were compensated for their potential lost income	2.96	1.18
A catastrophic disaster or emergency occurred from oil and gas development using hydraulic fracturing	3.09	1.24
Colorado significantly expanded its renewable energy production	3.04	1.36

Q9 To what extent are the interactions with the following groups important in achieving your personal or professional goals related to oil and gas development that uses hydraulic fracturing? (On a scale of 1 to 5; 1 = not at all important and 5 = very important)

N = 163	Mean Importance of Interactions	Standard deviation
Federal government	3.28	1.18
State government	4.35	0.72
County government	3.88	1.01
City government	3.48	1.26
Oil and gas industry	3.86	1.13
Oil and gas professional associations	3.19	1.32
Environmental or conservation groups	3.24	1.17
Real estate developers or home builders	2.49	1.03
Agricultural organization or farmers	3.23	1.06
Organized citizen groups	3.11	1.22
Churches or other religious organizations	1.92	1.09
Universities or colleges	2.94	1.22
Consulting firms or think tanks	2.37	1.08
Informal personal networks	2.57	1.20
News media	2.50	1.16

Q10 Since I became involved or aware of oil and gas development that uses hydraulic fracturing...

N = 163	Frequency of Responses	Percent of Responses
I have become more convinced about the benefits	62	38.04%
My views of the benefits have not changed	57	34.97%
I have become less convinced of the benefits	44	26.99%

Q11 Since I became involved or aware of oil and gas development that uses hydraulic fracturing...

N = 163	Frequency of Responses	Percent of Responses
I have become more concerned about the risks	58	35.58%
My views of the risks have not changed	62	38.04%
I have become less concerned about the risks	43	26.38%

Q12 How would you describe your working professional relationship with people you disagree with on the issue of oil and gas development that uses hydraulic fracturing in Colorado? (On a scale of 1 to 4: 1 = Not collegial at all; 4 = Completely collegial)

N = 163	Mean Level of Collegiality	Standard Deviation
Collegiality of relationships of those you disagree with	2.34	0.73

Q13 How would you describe your working professional relationship with people you agree with on the issue of oil and gas development that uses hydraulic fracturing in Colorado? (On a scale of 1-4: 1 = Not collegial at all; 4 = Completely collegial)

N = 163	Mean Level of Collegiality	Standard Deviation
Collegiality of relationships of those you agree with	3.04	0.67

Q14a Are there any organizations or individuals who have the authority and trust to help negotiate policy solutions to oil and gas issues in the United States?

N = 157	Frequency of Responses	Percent of Responses
Yes	89	56.69%
No	68	43.31%

Q14b If yes, please indicate the names of any such organizations or individuals:

Responses varied widely and include specific environmental organizations; the Colorado Oil and Gas Association; the Colorado Oil and Gas Conservation Commission; Governor John Hickenlooper; the Environmental Defense Fund; the Environmental Protection Agency; the Colorado Petroleum Council and scientific leadership at various institutions of higher education across the state.

Q15 To what extent do you think the following ways to influence government are viable for addressing your personal or professional goals for oil and gas development that uses hydraulic fracturing? (On a scale of 1 to 5: 1 = Not viable at all; 5 = Completely viable)

N = 160	Mean Level of Viability	Standard Deviation
General elections of government officials	3.53	1.07
Public referendum	2.84	1.26
Regulatory process	3.53	1.07
Legislative process	3.26	1.01
Court/legal process	3.31	1.08

Q16 In general, to what extent are you satisfied or dissatisfied with...? (On a scale of 1 to 4: 1 = Don't know/No opinion; 4 = Very satisfied)

N = 161	Mean Level of Satisfaction	Standard Deviation
CDPHE updates to Regulation Number 7 directly limiting emissions of all hydrocarbons, including methane?	2.75	0.94
COGCC Rules for Local Government Notification and Consultation for Large Urban Mitigation Area Facilities (Task Force Recommendation #17)?	2.56	0.95

Q17 Over the past two years, have the following issues in relation to oil and gas development that uses hydraulic fracturing in the United States become worse, stayed the same, or become better?

(On a scale of -2 to +2: -2 =Much worse; 0 = About the Same; +2 = Much better)

N = 161	Mean Level of Change in Quality	Standard Deviation
Government decision making processes	-0.02	0.98
Public trust in the COGCC	-0.18	0.93
Protection of the environment and public health	0.16	0.95
Economic benefits	-0.08	0.99
Greenhouse gas emissions	0.08	1.01
Consideration of vulnerable populations in political decision making	-0.22	0.87
Adoption and implementation of effective government regulations	-0.02	0.98
Intensity of the political debate	-0.44	0.88
Communication by media with the general public about risks and benefits	-0.40	0.94
The availability of scientific or technical information	0.43	0.86
Relations between state and local governments	-0.28	0.95
Environmental impacts and safety of hydraulic fracturing operations	0.24	1.03

Q18 Over the past two years, to what extent have you engaged in the following activities and used them effectively in achieving your personal or professional goals related to oil and gas development that uses hydraulic fracturing? (On a scale of 1 to 3: 1 = Engaged, but not effectively; 2 = Engaged and moderately effective; 3 = Engaged and very effective, with a response option for “not engaged”)

N = 160	Not Engaged (N)	Mean Level of Effectiveness of those Engaged	Standard Deviation
Brokering agreements between parties	63	2.04	0.63
Countering arguments made by people you disagree with	22	1.80	0.54
Mobilizing the public	76	1.94	0.57
Collaborating with people you disagree with	38	1.70	0.60
Coordinating political activities with allies	69	2.06	0.62
Providing information to government officials	22	2.09	0.60
Providing information to the news media	57	1.85	0.62
Sharing your opinion with government officials	20	1.99	0.64

Q19 When it comes to politics, do you usually consider yourself...

N = 159	Frequency of Responses	Percent of Responses
Extremely liberal	11	6.92%
Liberal	46	28.93%
Moderate	64	40.25%
Conservative	36	22.64%
Extremely conservative	2	1.26%

Q20 Please indicate the highest level of education you have attained:

N = 160	Frequency of Responses	Percent of Responses
High School Graduate	3	1.88%
Some College	17	10.62%
Bachelor's Degree	33	20.62%
Master's or Professional Degree	59	36.88%
J.D.	34	21.25%
Ph.D. or M.D.	14	8.75%

Q21 How much of a priority is it for you professionally or personally to deal with political and policy issues related to oil and gas development that uses hydraulic fracturing? (On a scale of 1 to 5: 1 =Not a priority; 5 = The highest priority)

N = 160	Mean Level of Priority	Standard Deviation
Priority of dealing with the issues related to oil and gas development that uses hydraulic fracturing	3.67	0.79

Q22 Please indicate your level of experience with the following: (On a scale of 1 to 4: 1 =No experience; 4 =A lot of experience)

N = 161	Mean Level of Experience	Standard Deviation
Researching or conducting science on the technical aspects of oil and gas development	2.43	1.14
Reading scientific studies about the economic, environmental, and public health impacts of oil and gas development	3.19	0.82
Analyzing economic or financial impacts of oil and gas development	2.78	0.86
Planning, working, or managing oil and gas operations	2.04	1.20
Owning or leasing mineral or surface rights toward oil and gas development	1.81	1.00
Living within visual proximity of oil and gas operations	2.11	1.16
Regulating or governing oil and gas development	2.64	1.21
Participating in political activities to influence government decisions about oil and gas development	2.64	1.16

Q23 What would you recommend, if anything, that might lead to better processes, policies, and outcomes in oil and gas development that uses hydraulic fracturing in the United States?

A diverse set of responses to this question were received. Some sample recommendations include:

- All parties need to be at the table, with open minds, and willing to work on a solution.
- Change the status quo – go with renewables!
- Federal government ban enforcement.
- Educate the media.
- Let municipalities regulate oil and gas operations within their jurisdiction like other zoning decisions.
- More meaningful public input that is actually considered by state regulators.
- Maintaining and expanding energy production is good for Colorado in general.
- More local/city control of well placement/setbacks and traffic mitigation.
- Open and honest communication is key here.
- A lot more opportunity for public input.
- Recognize that local governments are ill-equipped to regulated oil and gas development.
- More usage of solar power and other renewable energy sources, but not wind farms.
- Focus on the facts.
- Make the state fully engage in solving problems related to their regulation of oil and gas development.