

Shale Production And Governance: Risk, Trust, & Federalism



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FOREWORD

The Aspen Institute Roundtable on Shale Production and Governance was convened in Aspen, Colorado, June 4-7, 2016, to continue discussions held the past two years at our Modern Shale Gas and Oil Production Forum about governance strategies to deal with impacts of increased gas and oil production from shale. This report summarizes those discussions.

The overarching goal of this Roundtable was to encourage new, collaborative, cross-disciplinary, and non-partisan thinking among stakeholders with diverse experiences, disciplines, and views. Brief presentations kicked-off each session, with the majority of time reserved for informal and candid dialogue. The highly qualified group of speakers provided a wealth of information and a variety of perspectives, and the diverse expertise of a particularly well-qualified group of participants added to the richness of the dialogue. To encourage candor and create a safe place to explore ideas, all discussions are off the record.

This Roundtable specifically sought to present and test some of the topics and questions to be covered by the Aspen Institute Series on Energy Governance with representatives from industry, NGOs, regulators and some of the leading academics conducting research in the area of oil and gas governance and regulation. The Aspen Institute Series on Energy Governance is a new iterative series of dialogue-based convenings being supported jointly by the Alfred P. Sloan Foundation and the Cynthia and George Mitchell Foundation designed to bring to bear research and lessons learned in assessing concepts and policies in the governance of upstream unconventional gas and oil production activities across local, state, and federal jurisdictions in the United States.

Though smaller than a forum (usually ~50 participants; this particular Roundtable had 34 participants) this Roundtable created a valuable opportunity for state regulators to meet with each other along with experts and stakeholders from across the country and share ideas, experiences, and form new relationships. The wide ranging discussions highlighted several areas that will need continued discussion and analysis by the Series:

- Local/community impacts from oil and gas development;
- The process of continuous regulatory improvement;
- The need to better educate and engage the public regarding both the risks and benefits of development;
- The need to engage a broader range of voices in continued dialogue.

The Roundtable also benefited from a meeting convened immediately preceding the Roundtable in conjunction with the Interstate Oil and Gas Compact Commission and the Ground Water Protection Council of the regulators leading the State Oil and Gas Regulatory Exchange (SOGRE) peer regulatory assessment process – an idea initially discussed during the 2014 Modern Shale Gas and Oil Production Forum. At this meeting the SOGRE leadership reviewed the origins and purpose of the States First Initiative (SFI) which SOGRE is a part of, the Framework for Continuous Regulatory Improvement developed to guide SOGRE's work as well as specific consultation requests awaiting action by SOGRE.

Dave Grossman wrote this report. He ably captured the highlights of the wide-ranging discussion and distilled them into this report.

The newest member of our team, Anna Giorgi, handled most of the administrative and logistical arrangements which resulted in a smoothly run Roundtable. Timothy Olson provided important input and guidance on the development of the agenda and speaker management. I am grateful for their continued dedication and support

The Aspen Institute acknowledges and thanks the Cynthia and George Mitchell Foundation for their financial support of this Roundtable. Without their consistent commitment to our work, this Roundtable could not have taken place. We look forward to continuing to work with them along with the Alfred P. Sloan Foundation on the Aspen Institute Series on Energy Governance.

The speakers, participants, and sponsors are not responsible for the contents of this report. It is an attempt to represent ideas and information presented during the Roundtable, but not all views could be included, the views expressed were not unanimous, and participants were not asked to agree to the wording of the report.

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EXECUTIVE SUMMARY

The US is now the world's largest producer of oil and natural-gas. This new reality was primarily facilitated by technology advancements in horizontal drilling and hydraulic fracturing which enabled economically viable production from unconventional sources such as low-permeability shale formations. As this production has increased over the past decade or more, so too has the responsibility to identify and manage the potential risks to communities and the environment. This responsibility has historically rested primarily with state regulators but as the scale of this production

has grown and expanded into new regions – many of which with limited resources and experience to cope – and better knowledge of the potential risks has developed, the governance primacy of the states has been challenged. In spite of these challenges, much of the governance of shale development is likely to continue at the state level.

Examining the framework of governance involved in shale development is an effective way of identifying and responding to technical, political, and social risks.

State oil and gas regulators seek to balance a complex set of competing interests among their many stakeholders, including communities, industry, and political officials at all levels. State regulators often have a long trust relationship with industry, having worked together for decades to identify and resolve issues, with and without regulatory action. States also work with each other (e.g., through initiatives such as States First) to share experiences, compare rules, conduct peer reviews, and adopt regulatory innovations. However, when it comes to working with federal

regulators, particularly the U.S. Environmental Protection Agency (EPA), there presently appears to be a significant lack of trust and a lengthy list of frustrations. State regulators and industry actors complain about distant, unaccountable federal bureaucrats dictating what should happen in states through a slew of lengthy, confusing, inflexible regulations based on ideological agendas and insufficient consideration of varied on-the-ground realities. There is a clear shortage of social capital and personal relationships between the different levels of government, as well as between the federal regulators and industry.

Government and governance are not the same thing. Government often refers to a governing body, while governance often refers to the framework of governing – both architecture and process. Examining the governance involved in shale development can uncover more effective ways of identifying and responding to technical, political, and social risks. Examining governance involves exploring the operation of the multi-level, multi-actor networks of formal and informal institutions, including governments, non-governmental organizations, and market actors that are involved in shale development. This examination also involves assessing the structures and processes those institutions have in place to assess and address risks, allocate costs and benefits, adapt to changing circumstances, engage stakeholders, and foster trust and accountability.

Theories about the elements of best-in-class governance can also be useful. These theories can help illustrate how regulatory decisions depend on the competence, engagement, and integrity of individual regulators and their decisions should ideally be based on objective data and scientific analysis, listening empathetically and respectfully to people, and

ensuring people feel a sense of procedural justice. Pursuing the elements of best-in-class governance can be especially helpful in part because different actors intersect with, define, and respond to risks in different ways. Some focus on risks to the environment and public health, while others more acutely feel risks to ideology, lifestyle, and value systems. People and organizations also approach their understanding of factual claims with non-factual background assumptions and frames of reference (e.g., values, culture). Even if all the facts are agreed to, the values, principles, and preferences underlying risk management choices – such as whether to address the biggest hazards or the most likely risks, or whether to use regulations or voluntary measures – determine what decisions are actually made. With regard to governance and risks, both facts and values can be contested. Building a more nuanced map of the risk landscape can help an entity craft a more sophisticated governance pathway through it.

There are many challenges to achieving the idealized vision of governance most regulators and industry have – of regulatory decisions being based not on politics and ideology but rather on science and data. For example, regulators have to address many issues that are rife with uncertainty and judgment calls. Even where science theoretically could help, many scientists do not focus on science that regulators and other decision-makers need to address real-world issues. Where there is science available, the studies can be flawed or biased. Regulators are also struggling to absorb the huge volume of data being generated and make it manageable and useful. Even if the science and data are good, they might not be trusted, understood, or correctly interpreted by the public. The reality is that people often make decisions based on information that accords with their pre-existing beliefs – and that, in turn, drives politics and policy. Science and data play a role, but emotions, values, heuristics, and biases dominate. Still, data and transparency will only become more important, whether to create metrics that can track outcomes or to provide tools that companies can use to better engage with communities.

Further, communicating with communities and building trust with the public are continual, central challenges for regulators and industry. Growing populations in certain shale plays and the proximity, intensity, and scale of horizontal shale development are spurring a great deal of community concern about traffic, dust, noise, and other nuisances that accompany shale development on an industrial scale. Adding to community concerns is a perceived imbalance of power, where community members do not feel on equal footing with oil and gas operators or with the state when it comes to decision-making. State regulators can pursue a range of approaches to try to build trust with communities, including teaming up with other parties that are trusted for certain purposes (e.g., universities for research), enacting and enforcing strong regulations, being accessible to all (including hostile crowds), creating governance structures that bring in a broader range of stakeholder input, and building personal relationships with communities and local officials. Companies, in turn, have to protect their social license to operate by engaging with every community in ways highly customized to each community and to what the company is building or operating. Some companies communicate poorly with communities, dismissing risks in ways that provide no comfort to emotional, worried people. Respectful engagement and empathetic listening are key.

In the end, however, the effectiveness of any community and public engagement effort by regulators and industry seems to depend heavily on the audience being targeted. There are three almost entirely different groups involved in public conversations about shale development: (1) the people in communities where shale development is occurring who have legitimate concerns about nuisances; (2) the anti-fracking and divestment movements that oppose fossil fuel corporations and worry about climate change; and (3) the broader public. The first group is seeking to have their concerns about “fracking” addressed. The second requires the industry to be non-defensive, patient, positive, and proactive. The third could be engaged in adult conversations about energy preferences, including the benefits of fossil fuel production (e.g., improving the lives of the poor) and how climate mitigation and adaptation are pathways to a different discussion about the management and use (but not elimination) of hydrocarbons.

Communicating with communities and building trust with the public represent continual, central challenges for regulators and industry.

The complexity and polarization of the shale conversation suggests the need for a different way of framing the conversation. Future Aspen Institute convenings on shale production could seek to identify and explore the core challenges of building trust, communicating about risk, and engaging the public. A more frequent Aspen Institute dialogue that aims to produce some kind of findings, recommendations, or regulatory elements could also be valuable, perhaps focused on the challenge of prioritizing the long list of issues regulators have to address or on the strained federal-state relationship.

Some major takeaways from the 2016 Roundtable on Shale Production and Governance include the following:

- **Shale production does not exist in a single centralized governance structure - it involves several levels of government, crosses numerous states, and involves a range of heterogeneous entities - which results in profoundly different governance architecture, roles, and process across the various shale plays.**
- **Regulators at all levels of government, researchers and operators need to work together to determine what data about shale production is actually needed, how often, and in what form in order to better interpret risks, track progress and develop metrics that can track and verify progress.**
- **Community concerns about shale production and governance often correlate to distance from royalty checks and are often exacerbated by a perceived imbalance of power, where community members do not feel on equal footing with oil and gas operators or with regulators when it comes to decision-making.**
- **Natural gas from shale can help achieve near-term climate policy goals and discussion focused on climate mitigation and adaptation are pathways to more productive discussion about the management and use of natural gas.**
- **Findings, and/or recommendations from an Aspen Institute dialogue process prioritizing regulatory action for various jurisdictions and identifying regulatory elements necessary to foster an enhanced relationship between federal and state regulators could be quite useful especially given pending changes in federal and state leadership.**

UNDERSTANDING GOVERNANCE AND RISK

GOVERNANCE

Governance involves multi-level, multi-actor networks of formal and informal institutions, policies, rules, and practices. Encompassing both the architecture and the process by which power and authority are doled out and assigned, governance can provide a way to assess and address risks and to allocate the costs and benefits for the economy, the environment, public health, and other outcomes in a participatory way.

Government and governance are not the same thing, though the most commonly thought of example of governance is centralized governance, where the government sets a vision and allocates rights and responsibilities. Shale production does not live in a centralized governance structure; it involves several levels of government, crosses numerous states, and involves a range of heterogeneous entities. Shale governance includes decentralized, non-state actors such as NGOs (e.g., the Ground Water Protection Council's work on chemical disclosure), as well as market and economic actors.

Understanding the contours of the governance structure one is operating in can be aided by asking four core sets of questions:

1. What is the architecture and process? What is the organizational chart? Who are the actors? What are the rules, regulations, and markets? Do the architecture and process have the right fit and scale across time (e.g., legacy issues) and space (e.g., state versus local)?
2. Do the architecture and process foster adaptation, flexibility, and learning? Does the ability exist to respond to new information in a way that is efficient and that allows for innovation to happen?
3. Do the architecture and process foster involvement of diverse and non-state actors? Do they promote robust conversations? Is there a stakeholder process that creates investment across diverse viewpoints in such a way that it promotes buy-in in the outcomes of the process?
4. Do the architecture and process have the level of accountability needed in order to have legitimacy? Do they have they trust of the broad, diverse group of stakeholders?

With regard to the last two sets of questions, figuring out a way to make the process and the outcome legitimate and trusted by everybody is the holy grail of stakeholder governance – and it has proven to be nearly impossible to achieve. Still, simply having the conversations and engaging stakeholders can at least give people a sense of procedural justice, even if they do not like the substantive outcome. Stakeholders – the public, NGOs, industry, and others – have a well-documented craving for fair process. People want to know they had a chance to be heard and listened to by someone who is a neutral player and then given some feedback and reasoning for why the decision was made the way it was. Independent of outcomes, the process matters.

Good governance has to include attention to procedural justice.

Generally speaking, best-in-class governance is a function of competence, engagement, and integrity. Competence involves things like good analysis and sound science. Scientists and engineers who just want to “do their jobs” instead of answering uninformed questions from policymakers or the public are focused on the competence aspect – which is important but not sufficient for good decision-making. The best forms of governance incorporate empathic engagement, which involves really listening to people and treating them with respect. Best-in-class governance also operates with the utmost integrity, which goes beyond not taking bribes and includes wanting to hear from the public whose concerns are part of the larger public discourse. Responsible public servants sometimes just have to acknowledge that the public has concerns and that part of their job is to attend to them and be empathetic. Failure to address these “softer aspects” of governance can lead to lost public trust.

While governance structures are often deeply entrenched, they are not static and can shift over time to address problems, stakeholders, and technological innovation. For instance, the public raised concerns about disclosure of the chemicals used in fracking fluid, spurring a movement among NGOs and market actors towards a voluntary disclosure paradigm (i.e., FracFocus). Over time, that system moved towards something more regulatory, centralized, and state-sponsored in nature. Then some companies pledged to go beyond disclosure and to avoid use of any chemicals of public concern, shifting the governance back to market actors through technological innovation. (Another example of innovation spurring changes in governance structures and approaches could happen as traditional audits are replaced by real-time remote sensing.)

RISK ASSESSMENT, MANAGEMENT, & INNOVATION

As noted, governance is a way of identifying and addressing risks. In 1983, the National Research Council distinguished risk assessment (i.e., understanding and accurately characterizing risks) from risk management (i.e., making normative policy judgments informed by the risk assessment). Over the years, the distinction has broken down a bit, but the basic split remains between factual assessment and values-based management. When it comes to governance, both the facts and the values can be contested.

As a starting point, different actors intersect with and define risk in wildly different ways. There are all kinds of risks that could matter. Risks to the environment and public health tend to dominate conversations, but there are also risks to ideology, lifestyle, world views, and value systems. There is a spectrum from solid quantifiable risks to softer risks that are more difficult to deal with but no less important. People and organizations also have different risk tolerances; many will do more to avoid a loss than to realize a gain. In addition, there is a distinction between risks that feel chosen and ones that feel imposed.

It is also important to recognize that people approach their understanding of factual claims with non-factual background assumptions and frames of reference (e.g., values, culture). For instance, people come to think of the relationship between industrial activity and the environment or public health in a certain frame, seeing nature as either benign and resilient, ephemeral and fragile, capricious and unpredictable, or a mix of those. Good governance regimes have to recognize that people are coming to the conversation with cultural predispositions, varying ways of approaching risk, and different frames for understanding facts.

Even if all the facts are agreed to, the values and principles underlying risk management choices determine what decisions are actually made. Is the aim to take on the biggest hazard? To address the biggest risk (i.e., probability times hazard)? To do what is feasible until costs are excessive? To avoid any “unacceptable” risks? To simply not make things worse? To maximize net benefits? To address the problems that can be solved most quickly? Even if the

aim is clear, risk management raises all sorts of additional issues. Which entities should take action? Can innovation address the problem? Should there be regulations, and if so, with what kind of instrument and targeting which facilities? These are all value choices; science cannot answer these types of questions. Opponents of fracking and concerned citizens are always asking for more science, data, and studies, but even if the right study can be framed and executed, actions will still be informed by decision-makers making risk judgments.

Some public sector officials are starting to look at enterprise risk management strategies used in the private sector. While more risk analysis is better than less, the public sector is fundamentally different from the private sector. It may be that to deliver real public value, regulators need to take political risks at points in time that other actors in other contexts would shrink from.

This is not to say, however, that there cannot be innovation in risk and governance. There are four aspects to innovation: (1) a value deficit – something that does not currently exist that people would like to have, or something that may not exist in the future that people would like to keep; (2) new ideas on how to address that deficit; (3) value creation – translating ideas into something practical; and (4) buy-in – having a market or people willing to pay for the service, or having stakeholders and constituencies willing to partner with you on an issue. There can be many types of value deficits in a risk context, including threats to health, the environment, businesses, worldviews, and ideals. There can then be different ideas about ways to conceptualize risk (e.g., risk as an essential part of the journey of life) and take action on those conceptualizations; creative new ideas about risk and governance can be fostered, such as by bringing in influences from the arts and humanities to shake up an entity’s view of the world. There is also a definite need for buy-in from constituencies, and seeing risk as a threat to value can raise awareness of what different constituencies view as important and are fighting to protect. Building a more nuanced map of the risk landscape can help an entity craft a more sophisticated pathway through it.

Building a more nuanced map of the risk landscape can help regulators and the private sector craft a more sophisticated pathway through it.

COOPERATIVE FEDERALISM

The main governmental locus of shale governance is at the state level. The federal government also has a role, but there are clearly challenges and tensions in the federal-state regulatory relationship. There appears to be a fundamental lack of trust between some state regulators and the U.S. Environmental Protection Agency (and other federal agencies), as well as between industry and the EPA.

SHALE GOVERNANCE AT THE STATE LEVEL

State oil and gas regulators get handed the most intractable problems – the ones that do not get resolved in the private risk governance structure. Risk is part of regulators’ daily existence. They have to navigate competing interests, make tradeoffs, and operate in difficult political environments. In some states, the boom in shale development created issues (e.g., crime) with far greater initial salience to officials, communities, and the public than environmental risks. State regulators have many masters and stakeholders – communities, industry, legislatures, governors’ offices, local governments, the EPA, and others – and face challenges in finding the appropriate working relationship with all of them. Finding the right approach is all the harder because the world is constantly changing; when regulators think they are heading down a good path, something happens that necessitates a shift. The industry, for instance, operates in cycles of high and low activity, which can fundamentally alter regulators’ burdens and the levels of public concern.

States can be effective at devising the proper response to those changes and instituting appropriate new regulations or operational adjustments. Over the past few years, oil and gas producing states have addressed inactive wells, transparency around fracturing fluids, recycling of produced water, well construction requirements, data management, induced seismicity, and other issues. They do not address these issues in isolation, though. The seismicity issue, for instance, was a clear example of an issue requiring multi-actor governance, with data provided by industry, the scientific community integrally involved in helping states determine appropriate courses of action, and a range of agencies playing roles.

States have no shortage of issues to address, but they face challenges in figuring out what to tackle first. Regulators would also like to be able to look around the bend to know where bridges are out so they can avoid those looming problems. Ideally, regulators could take the best science before a problem arises, integrate it into a regulatory program and/or governance structure, and create a proactive solution – but there is only so much regulators can do. Regulators who try to be proactive sometimes get accused of overregulating and being heavy-handed. In addition, with so many unknown unknowns, adaptive governance that is flexible and can learn may be the most feasible approach. Besides, state regulators are often regulating under a cloud of crisis, being reactive instead of proactive and trying to catch up to events.

Some state regulators are of the view that many issues can be handled without prescriptive regulations by getting industry to acknowledge environmental problems and work to fix them. There is a long trust relationship between state regulators and the oil and gas industry, which have worked together for decades to resolve issues. Industry and state

regulators find ways to compromise and reach agreement because they respect each other and will work together into the future. If regulators and industry can get ahead of an issue, come to the table to exchange information and data, and come up with a policy to address it (even if that policy is voluntary), compliance can be 100% because the industry understands the risk, agrees with the risk, and helped devise the solution. With trust, industry also sometimes feels comfortable proactively identifying a problem and pushing for regulatory improvement to clarify best practices. (Conversely, when industry does not trust agencies, it is less willing to share data with them.) Problem solving with allies that have relationships and know the issues is preferable to regulatory enforcement. There are tangible examples of these kinds of successes in an array of states.

State regulators partnering with industry and the public to address issues such as chemical disclosure and seismicity was easier a few years ago, when the public had not yet been traumatized by the media about these issues. In a calm setting with everyone involved, all sides of the story could be shared and logical solutions developed. It is much harder to do that today, in part because the cooperation and knowledge base of industry probably would not be part of it. (Open, transparent communications among stakeholders foster trust, but lawsuits against industry immediately stop them from communicating openly.) Still, solutions can be advanced by bringing people who actually want to solve problems together in forums to share information. This is already happening with state oil and gas directors, field inspectors, and others. It is important to have the right people at the table, though; it has to be people interested in finding solutions and not just throwing rocks. Getting people together in the same room for open conversations can help stakeholders see each other as human beings, which facilitates talking about and addressing problems.

When regulators do have to regulate, initiatives such as States First let states work together to share experiences and regulatory innovations. States First focuses on five pillars: underground injection control, hydraulic fracturing, inspector training and certification, continuous regulatory improvement (through the State Oil & Gas Regulatory Exchange, or SOGRE), and science and technology transfer. SOGRE works with states to conduct peer reviews and assessments and to implement recommendations from white papers. SOGRE can in some ways be a proxy for regulatory review, allowing states to compare their rules with other states' rules, identify areas of divergence, and adopt regulatory innovations pioneered by others. SOGRE also allows states to assess their options, improve their programs, and get validation from other states about particular policies, providing a useful bulwark against knee-jerk political reactions by their legislators or governors.

Even if regulators are thoroughly committed to the principles of regulatory excellence and continuous regulatory improvement, they have further work to do to create a political and public environment that allows them to pursue and execute those principles. First and foremost, they need support from their Governors. Regulators have to keep educating legislators too, who tend to want few regulations but also want all impacts taken care of. Regulators have to keep educating the public as well, who may not realize that fracking regulations exist if those regulations are scattered across different categories instead of grouped into a single section focused on fracking. Creating governance architecture and processes that are appropriate to the nature of the problems will also require budget and employees. In addition, there is a need to develop regulatory agencies' inspectors, where competence, integrity, and engagement come together on a daily basis.

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STATE AND INDUSTRY VIEWS OF FEDERAL REGULATORS

The general view of state regulators and industry is that the more regulatory governance can be kept at the state level, the more it can tie to and address the concerns of stakeholders on the ground – and the less it can be influenced by ideology and biases. The higher the level of government involved, the less accountability and the more ideological and non-technical influences there are, which reduces the legitimacy of the process in some stakeholders' eyes. Under this view, federal regulators act without good reasons, pushing political ideology and failing to explain what is wrong with leaving regulation in the hands of the states. The impression of an anti-fossil fuel agenda being pushed in a slew of regulations reinforces the sense that cooperative federalism is at a low ebb.

In the past, when some state regulators talked to the EPA and other federal agencies, the regulators at least felt that the agencies listened, and if they did not take the regulators' recommendations, they at least explained why. That does not seem to be the case anymore. Rules are seemingly coming out every few weeks. The preambles mention contacts and discussions with states, but they include things such as webinars that are not designed to get real input. When the EPA

was planning its methane regulation, it went out to states to listen to their concerns about overregulation and duplication of effort, and that state input helped to inform what the regulation looked like, but the states selected for consultation were not necessarily representative of the different realities in states. In some states, the federal regulators did not even talk to all of the involved agencies. When states do comment on draft regulations, those comments are not really addressed well.

States are also frustrated when the EPA issues rules without any flexibility for states or industry, such as the methane rules. The perception of some state regulators and industry is that the EPA is issuing prescriptive regulations that do not account for the vast differences among states and operators. One-size-fits-all regulations from the federal level raise further questions about what input there was, whether there is a hidden agenda, and whether the rules represent the will of stakeholders. A better way might

be for the EPA to just set the goals and not dictate how to achieve them, which would allow companies to compete with and learn from each other; being overly prescriptive locks the industry into an approach in which technology and innovation cannot be meaningfully incorporated.

Industry has a range of other frustrations with the EPA as well. Federal regulators in DC do not seem to recognize that there are lots of really small operators that do not have time to read multi-hundred page preambles and rules in the Federal Register (often released just before a holiday). When the federal agencies put forth final rules that are substantially different from the draft rules, they do not republish it as a proposal and get new comments (as some states would be required to do), which can create frustration among entities that did not realize the final rules would affect them. For example, the EPA's methane rule initially did not cover low-producing wells, but the final rule did, and people with those wells may not have commented on the draft because they were not covered by it. Similarly, when a rule is supposed to cover a specific area (e.g., shipping oil by rail) but federal agencies add in a line that expands provisions to cover a broader set of actors (e.g., all modes of transport), many actors may not have commented on or even been aware of the rules that appeared to not apply to them. These types of occurrences reinforce the feeling of less accountability at the federal level.

Furthermore, when regulations are constantly changing, are very long, and have conflicting provisions, oil and gas operators do not really understand the regulations and just resign themselves to doing the things that seem to make sense based on engineering, science, and economics. This is especially the case for federal regulations. Companies can call state regulators, ask them what a provision means, and then do whatever the state regulator tells them is OK to do.

The impression of an anti-fossil fuel agenda being pushed in a slew of regulations reinforces the sense that cooperative federalism is at a low ebb.

Federal regulators rarely admit any course of action is OK, leaving resolution to the realm of lawyers; the process now does not bring people together in pursuit of solutions, but rather divides people and pits them against each other in court.

Federal (and state) rules and regulations also add up and remain on the books indefinitely, adding to the regulatory burden for industry. Some in industry argue that after some period of time (e.g., 10-15 years), all regulations ought to be up for review and renewal, to enable culling the pieces that did not work or are out of date. Federal environmental statutes also are largely out of date, designed for an era of big centralized polluters and burning rivers. On the other hand, many parties would be very wary of re-opening the Pandora's box of statutory or regulatory authority, as the outcomes could be worse than the status quo. In addition, some in industry would argue that mandatory review periods that already exist (e.g., for federal ozone rules) need to be lengthened.

The manifold criticisms of the EPA should not gloss over the fact that there is a need for the agency. The federal presence evens out the playing field across states. In addition, the oil and gas sector and other industries were environmental nightmares in the past in many places, and the agency still has a role to play now. Not all of the oil and gas industry is innovative and progressive; there are good players and bad. The same holds true for state regulators. The current EPA appears to be more ideological than prior EPAs, but there are people in the agency who are great. The world is not black and white, with good guys and bad guys, right and wrong. The agency also has to operate within constraints; it has statutes it has to comply with, and every rule the agency issues has people lining up to challenge it or to support it. If industry or conservative states are not suing the agency over something, the environmental community is.

There is a clear lack of trust and social capital between the federal agencies and the state regulators, as well as between the federal agencies and industry. If the industry and state regulators continually tell themselves that the EPA is incompetent, misguided, corrupt, ignorant, and the like, there will never be any improvement in the relationship. It is not clear that industry and state regulators could have constructive conversations with the EPA right now, nor that the EPA would want to have them. No value or improvements in governance can be created out of mutual hate and distrust. Without trust, there cannot be open and honest dialogue. There is a need to build personal relationships.

The manifold criticisms of the EPA should not gloss over the fact that there is a need for the agency.

THE ROLE OF SCIENCE & DATA IN GOVERNANCE

The idealized vision of risk-based governance involves making decisions based on science and data, not politics. There are many ways, however, in which this vision does not reflect reality.

SCIENCE AND GOVERNANCE

The aim of industry and regulators is generally to make science-based decisions, but there are numerous challenges to achieving that goal. For one thing, there are many issues regulators have to address that are rife with uncertainty and that science cannot answer (at least not yet), such as how far from storage tanks is “safe” for a community. Even where science could help regulators with some issues, that science may not be available. Many scientists are focused on their research and on publications that will get them tenure, not necessarily on the science that regulators and

other decision-makers need to address real-world issues. There are scientists who simply do not want to be in the applied policy-focused realm, even if money was available there. (There are organizations, however, that focus on putting science into the service of society; these kinds of bridging organizations, along with hybrid public-private partnerships, play a critical role.)

Where there is science available, it may not be good science. There are lots of bad studies that come out (though they are not as bad as the media interviews that come after them). There are also biases in research, driven by funding pressures and the fact that scientists are human. (Biases in research can be reduced through measures such as double blind samples – measures that industry-funded science should be utilizing as well.)

Even if the science is good, it may not be understood or trusted. Industry tends to do a poor job of communicating science to the public. The public is also very

confused about science right now and does not really understand how the scientific process works (e.g., believing that everything that is published or peer-reviewed must be right). If the public does not understand a field of scientific inquiry (e.g., hydrology, geology) or a particular set of scientific findings, then public acceptance of science becomes a question of trust and belief. If the public does not trust the organization that conducted and/or is presenting the science, it will not trust those scientific findings – or will tend to support the scientific findings that align with pre-existing beliefs, culture, and ideology (i.e., confirmation bias). Having lots of engineers explaining science and equations, whether in industry or in regulatory offices, in no way counters the fact that communities often do not trust that the science being presented is accurate.

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Science and policy also differ in their treatment of certainty and unknowns, which can further foster public fear and community concern. People that see industry coming into their backyard generally are not making decisions based on science, but rather based on emotions and value judgments. Science is never 100% certain, and if people fear that industry activity will affect their health or their kids' health, the lack of certainty creates fear and mistrust. Emotion is not just something to deal with or get past, even though engineers tend to dismiss it. People make decisions based on emotions, and regulations tend to be based on the loudest lowest common denominator. It is disingenuous to pretend those rules are actually based on science and that emotion does not drive politics, policy, and regulations. Science gets discounted really fast in favor of values, heuristics, and biases.

DATA INFORMING GOVERNANCE

The industry is moving into a more transparent, data-rich world, driven by technological change. Cheap sensors are starting to proliferate. Drones will be used to monitor sites and measure emissions. Silicon Valley will be offering solutions that automate the process of collecting and releasing data. Lots of data will be directly accessible to the public over the next few years. Making data useful in governance can be challenging though. As with much of governance, dealing with data may be multi-level and multi-actor, with different roles for different actors depending on whether one is talking about data collection, analysis, use, or communication.

For instance, data overload is a real concern. State (and local and sometimes federal) regulators lack the resources to deal with the volume of data coming in. In fact, there are already huge amounts of data that exist that are not being used. Regulators can stick data on a hard drive or in the cloud or in a box, but they often do not know how to actually use it. Reporting for reporting's sake or because the state might need data at some point in time could result in regulators being further inundated with data they cannot use.

Bringing researchers and operators together to figure out what data is actually needed, how often, in what form, and so forth can help make things more manageable.

It is also important for regulators to try to eliminate duplicative data requests and consider the costs, uses, and benefits of any new data requests. (On the other hand, there is a movement in data analysis toward machine learning, in which one cannot know whether a piece of data is useful or not; the private sector already is using machine learning to identify useful information, and there is great potential in the regulatory realm.) Some of the data overload problem can be solved with software as well, which can take data, interpret it, and produce useful chunks of information. Regulators can also tap into universities to help create data portals. More broadly, there is a need for information and data policies, which many states (and the federal government) lack.

An additional governance challenge related to data is the problem of public interpretation. For instance, if all information on seismicity were released, the public could not differentiate regular background seismicity from problematic new seismicity. An intermediary is often needed to interpret the data for the public, but that intermediary has to be both trusted and accurate. State regulators, for example, have had issues with the EPA putting out data that is not accurate, timely, current, or correctly interpreted for the public. The issues of data overload and public interpretation are important ones for the Risk-Based Data Management System (RBDMS) developed by the Ground Water Protection Council to consider. RBDMS has incredible amounts of data from oil and gas producing states, and there are avenues being explored for opening up that data to the public and to researchers.

Data and transparency will only become more important. Data can help track progress on addressing governance failures such as pollution. Data enables creation of metrics, such as leak rates, that can track outcomes over time and

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be used to show success; making the data transparent also allows the metrics to be validated by third parties. The boom in data and transparency also represents a huge opportunity for companies to build (or destroy) credibility with communities by telling their own stories and communicating what the data means.

TRUST, COMMUNICATION, & COMMUNITIES

The issues of trust and communication come up repeatedly in conversations about shale development and governance. One could argue that the governance system that involves the close partnership between state regulators and industry has not been successful because of the dramatic conflicts within communities around shale issues and the public distrust of regulators and the industry. Building trust and communicating with communities and the public represent central challenges for regulators and industry.

ORIGINS OF COMMUNITY CONCERNS

In areas where there is a history of oil and gas development, state regulators and industry have had an opportunity to build community trust over time. With some shale development, the industry is moving into new areas (or communities are expanding to where the industry is). Growing populations in shale plays and the proximity, intensity, and scale of horizontal shale development are spurring a great deal of community concern.

Oil and gas companies utilizing their risk assessment tools generally see low risks and high profits from shale development – unlike, say, deepwater drilling, there are not risks from fracking projects that could threaten the companies' existence. For communities, however, the hydraulic fracturing process, designed to crack open super-tiny pores in shale rock containing hydrocarbons, has different aspects that are worrying. The drilling sites bring traffic, noise, light, accidents, invasive species, and other problems, though multi-well pads and long-reach drilling have improved drillsite impacts. The wellpads themselves produce fluids that are contained in pits that sometimes, though rarely, leak; there is also still flaring going on at the pads, though less than there used to be. For almost all fracturing projects, the major risks are all on the surface, though wastewater disposal wells have spurred particular concerns about induced seismicity.

To an extent, the level of people's concern correlates to their distance from royalty checks. People earning royalties are more willing to put up with the traffic, noise, road degradation, and other nuisances that accompany industrial development, but there is no reason to expect such acquiescence from people experiencing only the negative externalities (apart from the secure affordable energy and economic benefit that accrue to everyone). That is theoretically where government is supposed to come in, addressing nuisances and other broader impacts (e.g., pollution) for which people are not compensated and making sure those risks address equity concerns and remain at societally-acceptable levels. (For example, the market as a governance structure values the social benefits of a stable energy system – people pay for it – but government action is generally required to address the negative environmental or health externalities that markets do not monetize or internalize.)

Adding to community concerns is a perceived imbalance of power, where community members do not feel on equal footing with oil and gas operators or with the state when it comes to decision-making. Community members view state regulators as leaning towards industry (e.g., regulatory commission mission statements that include a charge to

“foster” oil and gas development). This imbalance of power plays out in decisions by NGOs and citizens to take the fight against shale development to local governments and to ballot measures, where they feel less outgunned.

The trust barrier is also a cultural one in some places, driven by a perception of government as liars and cheats. The public sees governments (state and federal) as monoliths of bureaucrats, without recognizing the technical, professional, well-educated, well-trained people that work in a variety of agencies.

STATE REGULATORS AND COMMUNITY TRUST

State regulators can pursue a range of approaches to try to build trust with communities. Regulators have to have partnerships, but at arm’s length, to avoid the perception of being in bed with anyone. They can team up with other parties that are trusted for certain purposes (e.g., universities for research). They can try to improve their communications with the public about what regulators are doing, what fracking is, what regulators know, what regulators do not know, and the like. In addition, enacting and enforcing strong regulations can foster public trust in regulators, as well as in industry; if an industry actor is in compliance with strong, enforced regulations, then communities will be able to know where industry actors stand.

One key to building trust is for regulators to be accessible – including to crowds that will passionately criticize them. They can create governance structures that bring in a broader range of stakeholders, though there is a risk that regulators will spend a lot of scarce budgetary resources to get more opinions from the uninformed – and then the public engagement efforts will nonetheless be construed as government propaganda campaigns to persuade communities that fracking is harmless.

One governance approach to dealing with the range of concerns is a multi-stakeholder task force, such as the one created in Colorado in 2014 in a compromise to get some measures off the Colorado ballot. The Colorado task force consisted of seven members from industry, seven from NGOs or local governments, and seven distinguished citizens of the state. The task force came up with recommendations for policy and legislation to harmonize state and local regulatory structures related to oil and gas operations, with particular focus on issues such as state economic benefit and protecting public health and the environment. (The Colorado ballot in 2016 nevertheless has new measures targeting oil and gas development.)

State regulators can also try to build personal relationships with communities and local officials. Some state regulators have held meetings with municipal officials in local communities to discuss state roles and local roles in addressing the range of issues related to shale development. Most of the local control is over siting – where oil and gas locations can be – though there are some concerns about environmental impacts as well. For the most part, local governments want nothing to do with downhole issues.

INDUSTRY AND COMMUNITY ENGAGEMENT

Companies, of course, have a critical role. Regulators cannot develop regulations or go to every community to address every single issue that could affect a company’s social license to operate; the operator needs to work within the community to identify issues and solutions. Only the industry can defend the industry and do community relations everywhere they operate.

Companies respond to market forces, including stakeholders in communities that can impact a company’s reputation and present delays or barriers to access. Companies will take a range of measures to protect their social license to operate and assuage community concerns, but not to the point that the expenses of doing so make the project unprofitable. A company’s community engagement approach will be highly customized based on what the company is

building or operating and where. For some communities, a simple barbeque would be enough to meet the needs of the community, whereas others would require creation of a community advisory panel. Either way (but particularly in the latter cases), community engagement requires the commitment of top management and a willingness to actually be part of the community – identifying the problems and helping the community find and execute solutions.

Some operators do not do a good job of talking to communities, perhaps because they have the superior legal right and think they should be able to put injection wells and pipelines wherever they want – but those actions have repercussions for the communities and for the industry as a whole. Industry dismissing or downplaying risks is not a great way of communicating with worried people. Communication is also not only about how industry (or governments) talk to the public, but also about how they listen. Respectful, empathetic listening is key. Front-line employees should be trained to demonstrate empathy and to validate customers or the public in the initial encounter.

Communication is also not only about how industry (or governments) talk to the public, but also about how they listen.

There might be a model for the oil and gas industry in how chemical companies engaged communities around hazardous waste wells, signing pledges of responsibility and proactively educating communities about what the wells did, how the companies kept them safe, and the like; there were no uprisings about hazardous waste disposal. Similarly, last year the Army Corps of Engineers got ahead of the yearly floods, started educating people, explained the technical expertise and logic behind why flooding would be happening, and kept people informed – and the Corps did not get bashed when flooding happened.

On the other hand, sometimes attempts to engage the public and build trust can backfire on industry. In some places, companies have been operating for a long time, doing their work, and telling no one in the public anything; when a new company comes in and holds town halls to get community feedback on fracking, that company gets beat up for bringing fracking to an area that has actually had it for years.

PUBLIC CONVERSATIONS ABOUT SHALE DEVELOPMENT (AND CLIMATE CHANGE)

There are three almost entirely different groups having public conversations about shale development, and it is not clear that industry and state regulators thoroughly understand the societal context within which they are working. One group is the people in communities where shale development is occurring, who have legitimate concerns about nuisances; communication to those people should be relatively easy, focusing on what will be done to address the nuisances. There is a second, bigger picture group, though, that manifests itself in the divestment campaigns and anti-fracking movements, which grew out of the Occupy Wall Street movement and have a fundamental opposition to “corporate-ocracy”, world trade, and many other issues. This second group is also, to a degree, driven by larger concerns about climate change and fossil fuels. This group, while not directly impacting share prices, is influencing public opinion and shaping the frame within which the industry contends with controversies. The third group is the broader public that watches how industry engages and treats the activists and communities.

For the people in communities worried about nuisances, “fracking” has become a catch-all term encompassing a range of public concerns, most of which do not actually have to do with the hydraulic fracturing itself. Sometimes the concerns are about water, air, truck traffic, noise, or lights, but they are raised as problems with fracking. The benefits from fracking – such as secure, affordable energy – are seen as more diffuse and indirect, whereas the fear of harms seems much more direct. Addressing the actual causes for concern can better enable regulators and industry to mitigate those impacts.

Industry interactions with the second group are more challenging. Communicating with the anti-fracking movement about the important role that gas or oil plays in the future of the economy or for energy security will be pointless.

Climate change has become the dominant environmental paradigm in which the oil and gas sector is working. When industry fights that paradigm, it empowers its opponents; climate discourse has now taken root in the public mind in such a way that any attempt to deny the discourse reduces the industry's legitimacy. From industry's perspective, the rules seem to be different for their opponents, who do not have to tell the truth, make sense, or be consistent. In response, industry has to be non-defensive, incessantly patient, positive, and proactive.

Acknowledging climate concerns does not have to mean that industry does not defend fossil fuel production to the third group: the broader public. Civilization was created by the ability to concentrate energy, and much of the planet, especially the poor, might strongly prioritize access to cheap, secure energy over climate change concerns. The lives of people living in impoverished villages can be transformed by access to energy, and there are clear tradeoffs in some of the energy resources traditionally thought of as "clean", including greater land area covered and lower power density. The public has to be engaged in adult conversations about energy preferences and the environmental costs of energy. The oil and gas industry could proactively take hold of the discourse and talk about how climate mitigation and adaptation are pathways to a different discussion about the management and use of hydrocarbons – as opposed to pathways to their elimination. The industry will have a hard time accepting the climate paradigm, though, if it means accepting a long-term erosion of market share and profitability (or greater risks of multi-billion dollar liability judgments).

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As a whole, it has been too easy for all parties involved in the shale conversation to fall into polarized, overly simplistic perspectives, whether "industry bad, activists good" or vice versa. The more speculative the risks are, the harder it is to have a grounded conversation and the easier it is for people to hijack the conversation. The complexity of the issues suggests a need for a different way of framing the conversation so that all parties involved can see the benefits and costs, social good and social harm, and other factors involved in making decisions about shale production and governance.

MOVING THE CONVERSATION FORWARD

The annual Aspen Institute forums on shale production are useful for continuing broader discussions. For future forums (as in past ones), a key area seems to be building trust, communicating about risk, engaging the public, and dealing with the tremendous shift in the social and political aspects of oil and gas development (particularly shale). Discussions could focus on sharing best practices in public engagement, as well as detailed case studies and discussions about examples of success and failure. The technical engineering aspects of shale development seem to be well covered in other venues. Trust, communications, institutions, social capital, and restoring public trust in science all seem like a good fit for the Aspen Institute.

A more specific Aspen Institute dialogue that meets more frequently with the aim of producing some kind of findings or recommendations could also be valuable. Short of recommendations or findings, another approach would be for a dialogue to come up with regulatory elements (i.e., tools for the regulatory toolbox) that various jurisdictions and entities could consider. A dialogue could focus on the challenge of prioritizing the long list of issues regulators have to address – whether coming up with a way to set priorities or actually agreeing on joint priorities. The federal-state relationship could be another potential focus area.

An additional role the Institute could potentially play is one of an objective, unbiased, apolitical organization that can fact-check the shale conversation (akin to Politifact or Snopes.com), to give policymakers and regulators a place to go that is trusted. There are many partial truths and pieces of misinformation in the public dialogue on shale development. The Institute, however, might not be the right home for that kind of initiative.

Beyond the Institute, there is a need to expand this conversation to more people. In particular, in January 2017, there will be a whole slate of new federal and state leaders who know none of the intricacies of these policy issues and who will come in with preconceived notions. Having conversations with them and including them in future convenings (in a range of forums) will be vital. Including a broader array of federal agencies would also be useful, such as the Department of Energy, the Department of the Interior, the Bureau of Land Management, and the Pipeline and Hazardous Materials Safety Administration.

APPENDICES: AGENDA

SATURDAY, JUNE 4

6:30 – 9:30 PM **Opening Reception and Dinner**

SUNDAY, JUNE 5

9:00 – Noon **SESSION I: Modern Shale Production and Governance**

The U.S. is now the world's largest producer of oil and natural-gas enabled by the combination of horizontal drilling and hydraulic fracturing. As production has increased over the past decade or more, so has the need to identify and mitigate or manage potential risks to communities and the environment. Unconventional resource production and governance is a potentially wide-ranging topic extending all the way from upstream environmental impacts, midstream siting, permitting and safety, to local landowner and community impacts, and also royalty and resource wealth issues at the local and state planning levels. To start off a discussion on modern governance approaches, this session will look at the challenges and accomplishments by states and other levels of government.

Moderator: David Monsma, Executive Director, Energy & Environment Program, The Aspen Institute

Discussants:

Governance

Theory Amy Pickle, Director, State Policy Program, Nicholas Institute for Environmental Policy Solutions, Duke University

States

Lori Wrotenbery, Director, Oil and Gas Division, Railroad Commission of Texas

Community Concerns

Matt Lepore, Director, Colorado Oil and Gas Conservation Commission

Federal Role

Mark Rupp, Deputy Associate Administrator, Office of Congressional and Intergovernmental Relations, EPA

1:30 – 3:15 PM

SESSION II: Identifying Risk and Evidence-based Decision Making

The combination of legal liability and environmental management practices along with local, state and federal regulatory controls and enforcement provide reasonably adequate protection from undue risks from oil and gas production. What is the regulatory philosophy at the local, state and federal levels of government and what governance theories are used to guide policy formation and adopt evidence-based regulations in shale gas and oil production? What governance approaches are still evolving? How does industry, government and the public identify risk? How do they differ?

Moderator: Tisha Schuller, former CEO, Colorado Oil & Gas Association;
Strategic Advisor, Natural Gas Initiative, Stanford University

Discussants:

Scientific Risk Identification	Scott Tinker , Director, Bureau of Economic Geology, Jackson School of Geosciences, University of Texas at Austin
Regulatory Risk Management	Cary Coglianesi , Director, Program on Regulation, University of Pennsylvania
UIC Peer Review	Stan Belieu , Deputy Director, UIC Program, Field Operations, Nebraska Oil and Gas Conservation Commission
Evidence-Based Decision- Making In Practice	Cal Cooper , Director, Special Projects & Emerging Technology, Apache Corporation

MONDAY, JUNE 6

9:00 – NOON

SESSION III: Innovation Across Divergence Policies and Practices

Current regulatory divergence among states reflect important underlying differences in governance or regulatory assumptions– in particular geologic differences. Some of the divergence between states is logically unique to the state’s geology and experience with oil and gas development but other differences are philosophical and involve assessable governance options that are common across many states. What mechanisms allow states to address risks or regulatory challenges they have in common? How do states work with their federal counterparts to fill gaps between and among different levels of governance? What role can private governance mechanisms play? How can states, as the primary regulators of oil and gas development, document continuous regulatory improvement?

Moderator: Mike Teague, Secretary of Energy and Environment, State of Oklahoma

Discussants:

Innovation	Andrew Maynard , Professor, School for the Future of Innovation in Society, Arizona State University
SOGRE Update	Larry Bengal , Director, Arkansas Oil and Gas Commission

Operating Standards

Dave Glatt, Chief, Office of Enforcement, Environmental Health Section, North Dakota Department of Health

Regulatory Purpose

Brian Woodard, Director, EHS Regulatory Affairs, Chesapeake Energy

1:30 – 3:00 PM

SESSION IV: Moving the Conversation Forward

Building upon discussions in the preceding sessions and looking forward strategically, what are the priority needs that this group can identify or help clarify? Where should this discussion go next?

Moderator: David Monsma, Executive Director, Energy & Environment Program, The Aspen Institute

Discussants:

Al Collins, Senior Director, Regulatory Affairs, Occidental Petroleum Corporation

Scott Anderson, Senior Policy Director, US Climate and Energy Program, Environmental Defense Fund

Ken Harris, State Oil and Gas Supervisor, Division of Oil, Gas, & Geothermal Resources, State of California

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