



PRINCIPLED GOVERNANCE OF SHALE RESOURCES

A REPORT FROM THE ASPEN INSTITUTE
DIALOGUE ON ENERGY GOVERNANCE

For all inquiries, please contact:

Energy & Environment Program
The Aspen Institute
2300 N Street, NW | Suite 700
Washington, DC 20037
Phone: 202.736.2933
Fax: 202.467.0790

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The Aspen Institute
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DISCLAIMER: This report from the Aspen Institute Dialogue on Energy Governance is issued under the auspices of the Aspen Institute's Energy and Environment Program and attempts to capture information, ideas, and perspectives raised during a series of three convened dialogue meetings. Not all views expressed were unanimous; not all comments represent the aim or outcome of the meeting. Participants were not asked to agree to the wording of this summary and, therefore, speakers and participants are not responsible for its contents.

The Aspen Institute is an educational and policy studies organization based in Washington, D.C. Its mission is to foster leadership based on enduring values and to provide a nonpartisan venue for dealing with critical issues. The Institute has campuses in Aspen, Colorado, and on the Wye River on Maryland's Eastern Shore. It also maintains offices in New York City and has an international network of partners.

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The Aspen Institute Energy and Environment Program challenges thought leaders to test and shape energy and environmental policies, governance systems, and institutions that support the wellbeing of both nature and society. The Program's forums and dialogues are designed to cultivate trust and leadership, and develop collective solutions based on the ideal that both humankind and the natural world have intrinsic value. Like the Aspen Institute as a whole, EEP seeks to inspire and explore new ideas that provoke action in the world.

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PREFACE

Beginning in October 2016, the Aspen Institute Energy and Environment Program convened the Aspen Institute Dialogue on Energy Governance. This policy dialogue brought together a group of experts from the scientific community, industry, government, and other organizations focused on the governance of oil and gas development from shale resources. Over the course of the Dialogue, the group examined the different evidentiary foundations and approaches used in making management, policy and regulatory decisions. One of the initial goals of the Dialogue was to bring forward research and lessons learned regarding the governance of shale resource development and production across various levels of government.

The Dialogue commenced from the following question: *How should the development and production of natural gas and oil from shale resources continue in the absence of generally recognized principles (or standards) to identify, prioritize, and respond to its potential human health and environmental risks?* As the dialogue progressed, it became apparent that stakeholder engagement was a critical issue to examine more deeply, so an additional workstream was formed to answer the question: *How can stakeholders be more involved and better engaged throughout the process to address issues, discuss the management of potential risks and benefits, and seek to avert conflict?*

The major outputs of the Dialogue include findings, recommendations, and a principles based governance framework. Together these outputs seek to clarify and improve the current regulatory context for anticipating and managing risk in the governance of gas and oil development from shale resources, particularly through enhanced stakeholder engagement practices.

This report is issued under the auspices of the Aspen Institute Energy and Environment Program. Although it is an attempt to capture the views expressed during the Dialogue, not all views expressed were unanimous. The experts who took part participated in their individual capacity and their organizations are not responsible for the views or other content of this report.

As representatives of the Cynthia and George Mitchell Foundation and the Alfred P. Sloan Foundation, we are delighted to have supported this Dialogue and resulting

report. Together with the Aspen Institute Energy and Environment Program, we are excited to see the resulting findings, recommendations, and governance framework contained in this report. We believe they provide useful insights to those interested in continuing to improve the governance of shale resource development and production across the United States.

We thank all those involved in the Dialogue and this report for their valuable input throughout this process. In particular, we are grateful to David Monsma, former Executive Director of the Energy and Environment Program at The Aspen Institute, for his thought leadership on energy governance and extraordinary ability to bring disparate groups of people to consensus. Cary Coglianese's work on regulatory excellence helped lay the groundwork for this Dialogue and we benefited from his knowledge. We appreciate Matt Lepore who served as co-chair for most of the Dialogue series and provided extensive guidance on addressing real and complex problems related to energy development. We owe the report writing team our gratitude and another dinner at The Monarch. The team included Amy Pickle, Tanya Heikkila, Kate Konschnik, and Joe Kiesecker. Finally, thanks to the Aspen Institute Energy and Environment team for their dedication to and excellence in executing this project.

Marilu Hastings

Vice President
Sustainability Programs
The Cynthia and George Mitchell Foundation

Evan Michelson

Program Director
Energy and Environment Program
Alfred P. Sloan Foundation

INTRODUCTION

The United States is home to significant oil and gas reserves, particularly in shale and other tight formations. Onshore unconventional opportunities have been greatly enhanced in recent years with the advent of directional drilling technology combined with hydraulic fracturing completion techniques enabling the economical extraction of these domestic oil and gas reserves. Though production is sensitive to changes in commodity fuel prices, global markets, and competition from alternative energy technologies, oil and natural gas are expected to remain critical to the US energy future.

The economic and social value of these energy resources is important. Shale development creates jobs, contributes to local and state tax revenues, and provides secure energy supplies. Americans use large amounts of energy, as well as consumer products derived from oil and natural gas, and will continue to do so for the foreseeable future.

Shale production also poses potential risks to water resources, air quality, the climate, public health, and socioeconomic well-being. Therefore, as oil and natural gas production from shale resources has increased, so too has the need to identify, assess, and manage the risks to communities and the environment posed by this production. **The *intensity* and *scale* of the production from shale resources differs from most traditional oil and natural gas production. It can also occur in close *proximity* to communities and population centers, because shale basins are widespread, continuous geologic deposits.**

Though federal and local regulations play an important role, states are the primary regulators of oil and natural gas production in the US. States diverge in their regulatory approaches and often possess different levels of experience and philosophies for addressing risks. Even within a level of government, agencies with sometimes conflicting missions often share regulatory authority over different aspects of oil and natural gas production. Meanwhile, the oil and gas industry employs a variety of risk management practices when producing oil and gas or siting operations, alongside or absent regulatory directives. **The result is a mosaic of regulatory approaches and industry practices for relatively similar activities and resulting risks.**

Potential risks to public health and the environment have been the topic of intense public and policy discussion. The intensity of this discussion has amplified as the scale of production has increased and expanded into locations previously unfamiliar with oil and natural gas production. The public and policy discourse reveals the challenges of ensuring that diverse stakeholders are engaged in the governance of shale resources, and that decision-making is informed by scientific research and other evidence. Making sure that industry, regulators, and communities understand risks and regulate or manage those risks effectively are ongoing challenges.

A wide range of academic, government, and NGO efforts have attempted to characterize and analyze the risks and challenges in shale resource development, as well as the mechanisms for improving the governance of shale development. To better understand the nature and extent of the risks, many new research efforts have focused on how to improve the process by which data and evidence are collected and used in decision-making. Other recent research activities have focused their inquiries on the tools and processes of good governance; economic and social impacts; continuous regulatory improvement; and industry best management practices.

While many of the documented impacts associated with oil and gas development have been manageable to date, research is still thin, and effective governance practices have not been sufficiently baked into practice on a broad scale. **The decision-making and governance process for identifying and mitigating risks associated with shale resource development can potentially be improved and better coordinated to anticipate and mitigate risks to human health and the environment, while at the same time recognizing the ability of industry to produce oil and gas.**

ASPEN INSTITUTE DIALOGUE ON ENERGY GOVERNANCE – BACKGROUND

The Aspen Institute Dialogue on Energy Governance aimed to develop a range of ideas and recommendations to help better understand and improve the governance of shale resource development and decision-making. These ideas and recommendations, we believe, will help identify, prioritize, and respond to the potential risks to human health and the environment resulting from oil and gas production. The major emphasis of this work is focused on enhancing the collective capacity for recognizing and managing risks, and potentially improving the resulting regulatory decision-making process and industry practice, along with related choices at all levels of governance.

The Dialogue initially focused on analysis of different evidentiary foundations and decision making approaches used in environmental management, policy analysis, and regulatory development. Next, the Dialogue sought to clarify the current regulatory context for addressing risk management in the governance of oil and gas development

from shale resources, including the powerful effect that political and economic interpretations can have on public perceptions, governance and regulatory choices. The Dialogue relied on a process of facilitated dialogue aimed at advancing more coherent and informed regulatory responses at the local, state, and federal levels and in their coordination. The Dialogue examined ways to improve the quality of evidence and research, reduce concerns of bias, and enhance risk communication approaches used in governance and regulatory decision-making. The participants drew on a wide range of research and analysis on divergent policies and practices in order to both understand and address knowledge gaps where further research is needed, and to identify and examine practical actions that can be taken.

Specifically, the Dialogue sought to accomplish the following:

- *Understand the processes by which regulators, private sector operators, and community stakeholders identify and prioritize evidence of risks to communities and the environment posed by oil and gas production particularly from shale resources.*
- *Discuss different evidentiary foundations and research evaluation approaches used in environmental management, policy analysis, and regulatory decision-making.*
- *Propose how local, state, and federal agencies can better use scientific evidence on shale resource development to improve decision making.*
- *Clarify the current decision-making context for anticipating and addressing risk management in the governance of oil and gas production particularly from shale resources.*

VISION STATEMENT ON ENERGY GOVERNANCE

The US produces significant amounts of oil and gas from shale resources and is projected to continue to do so for some time. Both risks and benefits result from shale development. However, the nature and distribution of those risks and benefits are uncertain and complex, especially as the scale, intensity, and geographic distribution of shale resources grow. Innovative approaches to the governance of shale resources are needed to help manage these risks and benefits, and plan for its future trajectory.

Regulators and industry play key roles in decisions over whether, where, and how development occurs. However, the changing landscape of shale oil and gas development has rapidly expanded the universe of governance stakeholders, to include the growing number of communities where shale development takes place, and researchers studying and assessing shale development and its impacts. As shown in the figure below, shale governance stakeholders are influenced by political, legal, social, and economic systems, which are themselves dynamic and complex. Devising effective governance that serves all types of stakeholders and adapt to changing political, economic, social and legal forces, is challenging but essential.



To build a more robust governance system for shale development, the Aspen Dialogue Participants focused on three areas that require targeted improvements: stakeholder engagement; research on the scale of future development and associated impacts; and approaches for regulating shale impacts. Participants drew lessons from past and present experiences to establish principles of good governance and recommendations for implementing these principles, emphasizing these three areas. Ultimately, dialogue participants recognized that formalizing and institutionalizing good processes and governance can improve outcomes and reduce conflict.

This report identifies three broad recommendations to enhance shale governance, which were derived from a set of key findings and governance principles. “Findings” are the issues, challenges, or characteristics of shale governance that the dialogue participants collectively identified; “principles” are the values, goals, or aspirations that should guide how governance challenges should be addressed; and “recommendations” are potential strategies that may help to achieve the principles. The three recommendations are described in the following sections:

1. **Create early and more effective engagement among stakeholders** where all those interested in, able to affect, and affected by shale resource development – positively and negatively – can begin to address issues, discuss the management of potential risks and benefits, and seek to avert conflict;
2. **Develop and maintain reliable, timely and relevant use-inspired research** to help regulators, industry, and other decision makers make evidence-based decisions; and,
3. **Build capacity for regulatory excellence**, where a participatory framework and meaningful engagement drive continual, adaptive improvement of the regulatory process alongside evidence-based decision making.

FINDINGS AND PRINCIPLES

FINDING 1: EFFECTIVE STAKEHOLDER ENGAGEMENT IS NOT BEING PRACTICED SYSTEMICALLY BY REGULATORS OR THE INDUSTRY.

- **Principle 1.1** | Effective stakeholder engagement processes are multi-directional, inclusive, and seek to build trust.
- **Principle 1.2** | Processes require access to information and meaningful opportunities to influence both regulatory outcomes and industry decisions while recognizing the legal and economic limits that may restrict those outcomes and decisions.
- **Principle 1.3** | Processes must clearly articulate a purpose for the stakeholder engagement, the rationale that motivates participation, and acknowledge participants' diverse roles and definitions of success.
- **Principle 1.4** | Processes need neutral or trusted conveners and facilitators, especially if levels of trust among participants are low at the outset.
- **Principle 1.5** | Processes must start early in the shale development process, but adapt to the changing needs of stakeholders over the lifetime of energy development, from inception, through construction, operation, decommissioning, and land reclamation.

FINDING 2: EVIDENCE-BASED DECISION MAKING IMPROVES ADMINISTRATIVE AND REGULATORY DECISIONS FOR ADDRESSING SHALE OIL AND GAS RISKS AND BENEFITS WHEN IT IS BASED ON THE BEST AVAILABLE SCIENCE AND INFORMED BY STAKEHOLDER EXPERIENCE AND RELEVANT LOCAL CONTEXT.

- **Principle 2.1** | Research is needed at the site-specific and landscape level, and over the lifetime of energy development, from inception, through the construction, operation, decommissioning, and land reclamation phases.

- **Principle 2.2** | Research that is based on needs of regulators, industry, and other stakeholders, i.e., use-inspired, and prioritized to achieve measurable beneficial outcomes, will support evidence-based decision making.
- **Principle 2.3** | Clear research priorities and high data quality foster accountability and legitimacy in both the research and decision-making processes.
- **Principle 2.4** | Research transparency and accessibility are enhanced when findings are assessed and compared according to quality, scope, methodology, and replicability.

FINDING 3: REGULATORS MUST WORK WITH OFTEN SHARPLY DIVIDED STAKEHOLDERS TO IDENTIFY AND SOLVE PROBLEMS THAT REQUIRE NOT ONLY TECHNICAL COMPETENCY BUT ALSO AN UNDERSTANDING OF THE SOCIAL, ECONOMIC, AND LEGAL DRIVERS IN ORDER TO IMPROVE REGULATORY OUTCOMES.

- **Principle 3.1** | State oil and gas regulatory agencies must explicitly identify the economic and social concerns, values, and information used in their decisions regarding where the development of shale resources is appropriate and where it is not.
- **Principle 3.2** | State oil and gas regulatory agencies, working with other agencies, stakeholders, industry, and non-governmental organizations, need new analytical tools and approaches for planning less impactful shale resource development.
- **Principle 3.3** | The regulatory community needs to promote regulatory excellence and improve regulatory processes by identifying and implementing leadership attributes and principles, such as integrity, empathy and competence, in a continuously adaptive manner.

RECOMMENDATIONS

CREATE EFFECTIVE, EARLY ENGAGEMENT AMONG THE VARIOUS STAKEHOLDERS WHERE ALL THOSE INTERESTED IN, ABLE TO AFFECT, AND AFFECTED BY SHALE DEVELOPMENT – POSITIVELY AND NEGATIVELY – CAN RAISE ISSUES AND DISCUSS THE MANAGEMENT OF POTENTIAL RISKS AND BENEFITS.

- **Recommendation 1.1** | Build capacity and a leadership culture that embraces effective stakeholder engagement principles.
- **Recommendation 1.2** | Enhance and adapt stakeholder engagement processes.

DEVELOP AND MAINTAIN RELIABLE, TIMELY AND RELEVANT USE-INSPIRED RESEARCH TO HELP REGULATORS, INDUSTRY, AND OTHER DECISION MAKERS MAKE EVIDENCE-BASED DECISIONS.

- **Recommendation 2.1** | Develop and communicate research and data that addresses both the temporal and spatial scale of oil and gas risks and benefits to better meet the needs of regulators, industry, and other stakeholders.
- **Recommendation 2.2** | Identify research needs and priorities through adopting impartial procedures that align research and decision maker information needs, while recognizing diverse stakeholder values.
- **Recommendation 2.3** | Accomplish priority research to ensure accountability and legitimacy.
- **Recommendation 2.4** | Assess research quality standards according to scope, methodology, and replicability.
- **Recommendation 2.5** | Share research and information so that the research process is transparent and findings are accessible by all stakeholders.

ESTABLISH DEMONSTRABLE REGULATORY EXCELLENCE WHERE A PARTICIPATORY FRAMEWORK LEADS TO CONTINUAL, ADAPTIVE IMPROVEMENT OF THE REGULATORY PROCESS AND DECISIONS.

- **Recommendation 3.1** | Create a community of practice to guide regulatory decisions and actions.
- **Recommendation 3.2** | Establish an academy for state regulators that helps identify, share, and communicate standards for regulatory excellence across the community of practice.
- **Recommendation 3.3** | Connect the academy with existing regulatory training and information initiatives to expand the community of practice.

PART I: FINDINGS

FINDING 1: EFFECTIVE STAKEHOLDER ENGAGEMENT IS NOT BEING PRACTICED SYSTEMICALLY BY REGULATORS OR THE INDUSTRY.

Principle 1.1 | Effective stakeholder engagement processes are multi-directional, inclusive, and seek to build trust.

Principle 1.2 | Processes require access to information and meaningful opportunities to influence both regulatory outcomes and industry decisions while recognizing the legal and economic limits that may restrict those outcomes and decisions.

Principle 1.3 | Processes must clearly articulate a purpose for the stakeholder engagement, the rationale that motivates participation, and acknowledge participants' diverse roles and definitions of success.

Failure to establish effective stakeholder engagement processes can lead to increased tensions and conflict among stakeholders, as well as hamper industry's social license to operate.

Principle 1.4 | Processes need neutral or trusted conveners and facilitators, especially if levels of trust among participants are low at the outset.

Principle 1.5 | Processes must start early in the shale development process, but adapt to the changing needs of stakeholders over the lifetime of energy development, from inception, through construction, operation, decommissioning, and land reclamation.

Consistent and widespread adoption of the principles of effective stakeholder engagement has not occurred in shale governance. This is particularly problematic for regulators and industry, as they bear primary responsibility for the ultimate decisions on how, where, and whether shale development takes place. Failure to establish effective stakeholder engagement processes can lead to increased tensions and conflict among stakeholders, as well as hamper industry's social license to operate.

By contrast, robust stakeholder engagement can play an important role in mitigating and addressing conflicts by new and ongoing development. As highlighted above, effective engagement requires the ability for stakeholders to engage in dialogue with one another (“multi-directional” communication), while making information accessible and affording affected stakeholders a genuine opportunity to inform decisions. Stakeholders can participate more fully when all participants have a common understanding of each other’s roles and authorities, and of their different definitions of success. Finally, neutral or trusted conveners and stakeholders can assure participants of a fair outcome. The goals, participants, and structure of processes, however, need to be adaptive to the different contexts and issues that arise over the lifetime of shale development. When stakeholder processes apply these principles, they are more likely to build trust among stakeholders with divergent interests and goals, foster learning, help identify creative solutions to previously intractable problems, and build governance capacity.

The dialogue participants recognized several challenges that can impede the implementation of effective stakeholder engagement. First, many of the decisions related to shale development siting are private in nature – involving industry, private land owners, and private mineral owners. These actors may not see the value of stakeholder engagement in early stages of development, when competition over leasing takes place. Once leases are in place, others suddenly affected by imminent development feel they have no voice in the process, reducing their incentive to engage in the process. Second, stakeholder engagement can be time-consuming and out of sync with the market forces that may dictate when development begins and ends. Third, real engagement is supplanted too often by one-way communication (e.g., industry or regulators informing communities that development will be occurring). Poorly designed one-way communication can increase distrust among stakeholders. Even where multi-directional communication occurs, it can be challenging to incentivize diverse participation if stakeholders do not trust the convening parties. In addition, power dynamics, and widely varying capacities and knowledge can strain effective engagement. Fourth, each “type” of stakeholder is not static or homogenous – regulators, industry, residents in a town, environmental groups, and others may hold divergent views with others in their “group.”

Dialogue participants identified and discussed several examples of stakeholder engagement, both from experience and from academic research, which illuminate approaches that may overcome these barriers. These include formal or legal processes and informal or voluntary strategies, which have been employed by some operators, industry associations, regulators, local governments, and other stakeholders involved in shale development. Examples of effective stakeholder engagement outside of the shale arena, for instance in the mining and power sectors, also offer comparable

best-practices from which shale governance stakeholders can learn. The recommendations and actions described later in this report build off these experiences and offer practical steps for building a governance system founded on these principles.

FINDING 2: EVIDENCE-BASED DECISION MAKING IMPROVES ADMINISTRATIVE AND REGULATORY DECISIONS FOR ADDRESSING SHALE OIL AND GAS RISKS AND BENEFITS WHEN IT IS BASED ON THE BEST AVAILABLE SCIENCE AND INFORMED BY STAKEHOLDER EXPERIENCE AND RELEVANT LOCAL CONTEXT.

Principle 2.1 | Research is needed at the site-specific and landscape level, and over the lifetime of energy development, from inception, through the construction, operation, decommissioning, and land reclamation phases.

Principle 2.2 | Research that is based on needs of regulators, industry, and other stakeholders, i.e., use-inspired, and prioritized to achieve measurable beneficial outcomes, will support evidence-based decision making.

Principle 2.3 | Clear research priorities and high data quality foster accountability and legitimacy in both the research and decision-making processes.

Principle 2.4 | Research transparency and accessibility are enhanced when findings are assessed and compared according to quality, scope, methodology, and replicability.

GOVERNING SHALE OIL & GAS DEVELOPMENT IS COMPLEX.

Current interaction between regulators, industry, communities, and researchers is inconsistent and irregular.

THE EXPERIENCE-BASED DYNAMIC GOVERNANCE FRAMEWORK

catalyzes more organized, sustained communication for more effective governance of shale resources. Here's how:

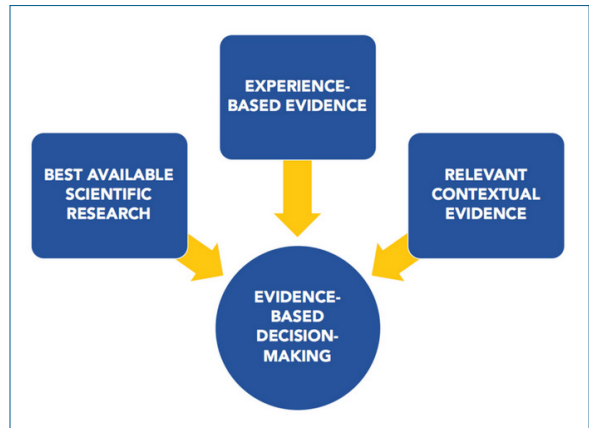
- 1 **ENHANCE** collective capacity for recognizing, assessing and addressing risks.
- 2 **ACKNOWLEDGE** different tolerance for risk and different beliefs among actors.
- 3 **ENSURE** appropriate spatial and temporal scale, and intensity.
- 4 **IDENTIFY** means to continually improve the regulatory decision-making process.
- 5 **ALIGN** the purposes, objectives, and actions among multiple systems and actors while also recognizing and bridging the gaps between them.

Evidence-based decision making is a process by which credible and reliable information about risks and benefits is collected and used by decision makers and other stakeholders to inform and improve decisions. It is built on relevant, accessible, unbiased research that reflects the local context, as well as the research priorities of regulators, industry, and other affected stakeholders. Such research can be a bridge between regulatory policy, stakeholder values, and traditional academic research. The Dialogue participants believe that improv-

ing relevance, quality and accessibility of research could improve decision making. The principles outlined above reflect the participants' views on the essential attributes of research that enable it to more effectively support evidence-based decision making.

Evidence-based decision making is hampered by incongruities between information needs of decision-makers and other stakeholders, and the traditional research approach. Regulators must often act despite uncertainties that arise from a lack of research or data or the lag time between publishing quality research and regulatory decision-making timelines. In addition, data may not be collected in a common format, aggregated, or otherwise made accessible to regulators, industry, and communities. Research and data may not reflect local context or stakeholder assessments of risks and benefits. Furthermore, regulatory decisions may be legally limited to specific sites; therefore, research on landscape or regional impacts, even when they reflect stakeholder concerns, may not be useful to regulators. These challenges are not unique to the shale context, but where shale oil and gas development is particularly controversial, regulators often face heightened scrutiny. Use-inspired research that considers the information gaps of regulators, policymakers, industry and other stakeholders, along with local or regional context, could begin to address some of these challenges.

Dialogue participants felt that the information produced through use-inspired research can facilitate evidence-based decision making. To integrate use-inspired research into evidence-based decision making, research needs assessments



should be developed that identifies and prioritizes the research necessary to support sound decisions. These needs assessments should acknowledge the roles of stakeholder knowledge, community values, and local context in the decision-making process. In addition, not all research needs to come in the form of a peer-reviewed academic publication. In some instances, policies and procedures can encourage the production of research and data from those best able to produce it (for instance, industry), and enable parties to share data while providing appropriate proprietary protections. The recommendations outlined below are a first step in increasing the quality and accessibility of use inspired research to support evidence-based decision making in regulatory processes, industry decisions, and stakeholder engagement.

FINDING 3: REGULATORS MUST WORK WITH OFTEN SHARPLY DIVIDED STAKEHOLDERS TO IDENTIFY AND SOLVE PROBLEMS THAT REQUIRE NOT ONLY TECHNICAL COMPETENCY BUT ALSO AN UNDERSTANDING OF THE SOCIAL, ECONOMIC, AND LEGAL DRIVERS IN ORDER TO IMPROVE REGULATORY OUTCOMES.

Principle 3.1 | State oil and gas regulatory agencies must explicitly identify the economic and social concerns, values, and information used in their decisions regarding where the development of shale resources is appropriate and where it is not.

Principle 3.2 | State oil and gas regulatory agencies, working with other agencies, stakeholders, industry, and non-governmental organizations, need new analytical tools and approaches for planning less impactful shale resource development.

Principle 3.3 | The regulatory community needs to promote regulatory excellence and improve regulatory processes by identifying and implementing leadership attributes and principles, such as integrity, empathy and competence, in a continuously adaptive manner.

Understanding and addressing sharp differences among stakeholders calls for an inclusive and impartial decision-making process.

Regulatory decisions over whether and how shale development occur are complicated by several factors. As discussed, the intensity and scale of shale oil and gas development differs from traditional forms of oil and gas development. As development encroaches on communities, its positive and negative impacts are not evenly distributed, creating strong differences of opinions about shale energy within communities.

Moreover, development now occurs in areas unfamiliar with shale oil and gas, taxing the capacity of regulators. Without effective regulatory capacity to address this intense and sometimes unfamiliar development, actors retreat from one another, exacerbating value conflicts and inhibiting rational engagement around risks.

Another challenge for regulators is that the private nature of mineral rights ownership in the US means that they are not positioned well to address some of the concerns that arise over development. Often by the time a community knows oil and gas development will take place, leases enabling access to resources have been secured and the decision of whether to produce has already been made. Residents and local governments are left scrambling to learn more about the activity and its potential benefits and risks. Other times, oil and gas development is initially welcomed, but

then challenged by expansion plans, a well-publicized accident or pollution incident, political pressures, or some other force. Across these scenarios, regulators are forced to make decisions in sharply polarized environments.

To gain credibility, regulators must provide thorough explanations for their actions while aiming to maximize public benefits and minimize risks. Yet, in such a contentious environment, regulators may not be able to obtain adequate data and credible information. As discussed, one aspect of improving decision-making in this contentious environment is to create and communicate use-inspired research. Meanwhile, understanding and addressing sharp differences among stakeholders calls for an inclusive and impartial decision-making process. Regulators can serve an important role in leveling the playing field between stakeholders – industry, communities, scientists, and local governments – by employing soft power to drive open and engaged conversations about risks and response.

Regulatory excellence is required, to manage conflict with integrity, empathy, competence, impartiality, and a sense of accountability¹. In addition, regulators should be armed with adaptive authority, to be able to respond to new risks or embrace new technologies as they emerge. A principles-based approach to governance would strengthen and improve how regulatory agencies assess scientific evidence in decision-making, communicate regulatory goals, and foster adaptive and continuous regulatory improvement under differing regulatory conditions for activities that are inherently heterogeneous. Regulators should be supported and offered additional capacity to provide excellent service. In addition, they should operate within a larger “web of governance” that leverages the knowledge and activities of other stakeholders to identify and respond to risk.

¹ Cary Coglianese, “Penn Program on Regulation,” University of Pennsylvania Law School, <https://www.pennreg.org/>

PART II: RECOMMENDATIONS

CREATE EFFECTIVE, EARLY ENGAGEMENT AMONG THE VARIOUS STAKEHOLDERS WHERE ALL THOSE INTERESTED IN, ABLE TO AFFECT, AND AFFECTED BY SHALE DEVELOPMENT – POSITIVELY AND NEGATIVELY – CAN RAISE ISSUES AND DISCUSS THE MANAGEMENT OF POTENTIAL RISKS AND BENEFITS.

Providing a meaningful opportunity for stakeholders to inform and influence on-the-ground practices may minimize later conflict. Given their central position in deciding whether and how development occurs, regulators and operators should play prominent roles in devising, improving, and implementing stakeholder engagement processes. At the same time, local governments, non-profit groups, researchers, land-owners, mineral rights owners, and affected communities play a critical role in supporting these efforts, or potentially leading and facilitating processes. In addition, in some cases “stakeholders” might include those actors to whom the primary stakeholders are responsible – project investors, insurers, or organizational funders, for instance. Finally, neutral and trusted conveners may be necessary, to assuage fears of a biased process.

Relationship building is the overarching goal of effective stakeholder processes. Processes should enable multi-directional communication, facilitate openness between parties, and promote accessibility by taking into account differences in time availability and capacity to engage. Openness and accessibility means ensuring that those affecting or affected by shale development can have the opportunity to be involved. It is important not only for conveners of processes to conduct thorough stakeholder mapping and outreach, but also to take into account logistical challenges of geographic distance and scheduling of meetings. Stakeholders from affected shale development communities should feel empowered in the process, particularly through clear expectation setting, recognition of the value of their input, and an understanding of their specific rights and roles in the process. In addition, all stakeholders should come to the table with a mindset of genuine and open engagement, and foster meaningful engagement. This requires those stakeholders with decision-making power to be willing to adapt policies and practices in response to

the ideas that emerge within the engagement process, while communicating from the outset what cannot be changed given lease terms or other legal realities. Starting processes early, before development occurs, can also be critical for participants to feel they have a genuine voice in the process. At different phases of engagement, especially where trust is low, participants benefit from having a neutral and independent third party to guide the engagement process. Sustaining engagement over different phases of the life-cycle of shale development further fosters a culture of engagement and trust building, and enables parties to anticipate and generate proactive responses to new challenges.

To achieve these goals, we recommend two specific actions: 1) build capacity and a culture that values and supports the principles of effective stakeholder engagement; and 2) enhance and adapt existing stakeholder engagement processes. Below we describe these actions and offer illustrative examples for implementing them.

- **Recommendation 1.1** Build capacity and a leadership culture that embraces effective stakeholder engagement principles.

To foster genuine participation, regulators and industry should evaluate their commitment to stakeholder engagement, in which potentially affected community members, local governments, and NGOs are given a meaningful and enduring opportunity to participate in the development process from the earliest possible phases so that their input can influence on the ground decision-making. This requires leadership among industry, regulators, and other stakeholder organizations to commit to the principles of stakeholder engagement and actively disseminate and operationalize these principles within and across their organizations and sectors.

Even absent a legal obligation to engage stakeholders, regulators and industry should voluntarily engage stakeholders in meaningful dialogue about development. Industry should provide more regular opportunities to discuss plans and operating practices, and work with stakeholders to establish best management practices that may eliminate or reduce impacts to the extent practicable. At the same time, regulators can take a more proactive role in engaging with diverse stakeholders to discuss concerns that arise before, during, and after development. To do this, both regulators and industry need trained staff who know how to effectively identify and communicate with stakeholders, and dedicated resources to sustain engagement processes. Creating industry-wide or agency standards for best management practices associated stakeholder engagement is also critical.

One strategy to enhance the capacity and culture for effective engagement within industry would be to establish a National Operator Advisory Board. This could help operators work collectively towards more effective engagement practices regarding energy, environmental, and related public policies that encourage responsible explo-

ration, development, and production of oil and gas from shale resources. An entity such as the American Exploration & Production Council (AXPC) could help set standards and provide guidelines for operators to use in developing company-specific public engagement strategies.

Meanwhile, regulators could work more closely with local governments and the communities most immediately affected by shale development. This might be accomplished through a Local Government Engagement Training Resource focused on providing information about shale oil and gas production that can aid meaningful engagement and strategies for engagement such as a travelling or online training module. This resource could disseminate information about the initial steps involved in oil and gas development before landmen from oil and gas operators enter an area and would improve engagement before development begins. This resource could also help community leaders and citizens develop strategic investment plans to manage funds raised from local, state, federal, and private sources. Potential leads for this program might include ECOS or the National Association of Regional Councils (NARC). Regulators also might build better capacity and a culture that supports stakeholder engagement by following the recommendations later in this report for regulatory excellence.

- **Recommendation 1.2** Enhance and adapt stakeholder engagement processes.

Many existing shale governance processes already formally require or rely on informal mechanisms for stakeholder governance. Yet existing processes often do not meet the expectations of successful stakeholder governance or appear ill-suited to addressing new issues, or new stakeholders, as patterns of shale development shift.

First, effective engagement should begin by embracing a broad understanding of stakeholders to include relevant parties that may be affected by development, and carefully mapping relevant stakeholders. Re-considering, and articulating the incentives for participation, and respective roles and responsibilities of different participants, is also critical. As part of this adaption process, conveners of stakeholder engagement should pay attention to the collective decision-making power of the group, given legal and economic realities, and note how power dynamics shift over time in stakeholder processes.

Second, it is important to link or connect existing engagement processes to each other. For example, state-level engagement processes should link to community level engagement, perhaps by requiring that key stakeholders participate across both venues, or at a minimum, have mechanisms to inform each other. This builds a more robust overarching governance system by extending the relationships, experience, and knowledge across decision-making scales.

Third, conveners need to incorporate periodic reviews of existing processes and requirements. As the context and stages of shale development shift, the engagement process likewise will need to adjust. Different stakeholders may need to be brought into the process at different stages. As issues change, or conflicts arise in engagement processes, neutral facilitators or new ground-rules for who participates and what topics can be covered may also be critical.

When adapting stakeholder engagement processes, it is also critical to consider the scale and scope of issues. For issues that are statewide in scope, for instance, regulators or state governments might establish Issue-Specific Task forces/Commissions to bring together interests across the state and from diverse perspectives, focused on timely challenges. One successful example is the Oklahoma Coordinating Council on Seismic Activity. The state formed the council as a venue to bring together relevant stakeholders to discuss, share data, and identify proposed actions for understanding and mitigating problems associated with seismic events associated with oil and gas development.

Regional and basin-wide issues can also be tackled through broader stakeholder engagement venues. At the regional level, there are growing concerns about cumulative effects of development on a landscape, which highlights the need for planning and assessing these regional issues. We recommend that industry or governments develop Regional/Basin Development Boards to aid in creating local engagement strategies for operators of all sizes within a specific operating area. The boards could consist of operators and members of local government/communities in the region, and also include members of the national operator advisory board (see above) who operate in the region. An existing example is South Texas Energy & Economic Roundtable (STEER), which works with communities and local governments in the Eagleford Shale play.

Similarly, there are opportunities to tailor stakeholder engagement to local or community-level concerns, which are often the most visible, but also feed into larger-scale conflicts. One alternative is to create a Local Government Designee Program, which would identify a single point of contact within local governments to lead engagement with and between regulators, operators and residents about oil and gas development. The Local Government Designee Program in Colorado might provide a good model, especially if paired with the following additional features to further help ensure success in practice:

- ⇒ Operators could be required to register with the Local Government Designee in the local government counties, municipalities and special districts they operate in.
- ⇒ Operators could be required to provide a development plan to the Local Government Designee for use in local planning and investment decisions.

- ⇒ The state regulator could provide financial assistance for Local Government Designee training.
- ⇒ The state government could provide funding to assist local governments in the creation of Local Government Designee positions.

DEVELOP AND MAINTAIN RELIABLE, TIMELY AND RELEVANT USE-INSPIRED RESEARCH TO HELP REGULATORS, INDUSTRY, AND OTHER DECISION MAKERS MAKE EVIDENCE-BASED DECISIONS.

The safe, reliable, and economical discovery and extraction of shale oil and gas depends on the convergence of well-functioning energy markets, technological advancement, research, effective regulations and inclusive stakeholder processes. However, the scientific research and data available to regulators and other stakeholders do not always meet their needs. Decision makers are under increased pressure to consider vast amounts of highly technical research, both when developing broad policies and reaching site-specific decisions. At the same time, given legal deadlines and other constraints, regulators are often forced to act with incomplete and imperfect information. In the absence of information, stakeholders may assess the risks associated with shale oil and gas development and exploration differently than regulators or the industry, which may accelerate conflict. Uncertainty is inherent in both the scientific and policy-making contexts. It cannot be eliminated. Conflict related to uncertainty may be reduced if what is known and unknown is conveyed to all stakeholders honestly and transparently.

Furthermore, shale oil and gas exploration and development is progressing at an increased pace and scale in both areas with preexisting oil and gas and in areas without previous development. Risks can occur over a shorter period of time due to the increased speed and intensity of development, or remain latent or undetected for a period of time. Risks can also be observed at both the site-level and landscape-level. As a result of this heterogeneity, regulators, industry, and stakeholders need research and data at different spatial scales and across the lifecycle of development.

To enhance trust among stakeholders and support evidence-based decisions, the Dialogue participants felt that it was critical to better align scientific research and the needs of regulators, stakeholders, and the industry, to promote trust in the regulatory process, facilitate informal stakeholder processes, and minimize conflict. The following recommendations outline the need to develop research that better matches the pace, scope, and scale of shale oil and gas development and four interrelated steps designed to create use-inspired research and connect it to evidence-based decision making.

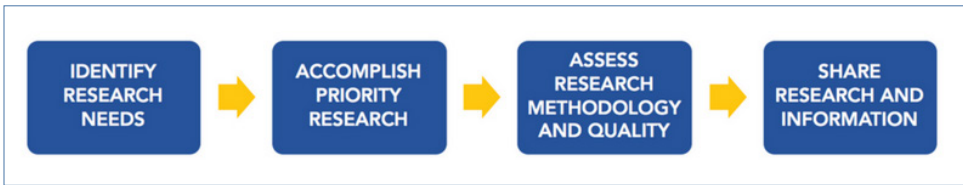
- **Recommendation 2.1** Develop and communicate research and data that addresses both the temporal and spatial scale of oil and gas risks and benefits to better meet the needs of regulators, industry, and other stakeholders.

Use-inspired research requires multi-directional communication between regulators, industry, stakeholders and researchers in order to identify everyone's concerns, needs and information gaps and to connect these needs to research. Use-inspired research can support both regulatory and voluntary efforts to define the environmental, social, and cultural values of diverse stakeholders. Effective stakeholder processes need research that helps develop options to avoid, minimize, and mitigate impacts and communicate benefits. In addition, regulators need research that provides information that can be used in their decision making to balance public good and private rights. Use-inspired research benefits regulators, industry and stakeholders by supporting more informed development decisions, promoting comprehensive risk management and offering greater predictability and transparency, which can reduce conflicts, delays, and costs. Therefore, use-inspired research should help define the needs that exist among stakeholders, oil and gas development needs, enable assessment of diverse types of impacts, and support the development of options to avoid, minimize, or mitigate them.

Use-inspired research can also focus on landscape-level or regional impacts that may be of concern to communities, but not critical for individual permit or site-specific decisions. One strategy for addressing the incongruity between the temporal and spatial scale of shale oil and gas development and stakeholder needs is to develop information that predicts development footprints and identifies potential impacts. Predictive modeling techniques have been used in recent years to predict changes in land cover associated with anticipated energy development. These predictive modeling tools can be used to describe landscape-scale development scenarios, helping inform decision makers and the public about patterns of anticipated development and potential impacts. Coupling future development scenarios with stakeholder values, including conservation values, can help regulators, the industry, and stakeholders assess the integrated opportunities for achieving better economic, social, and environmental outcomes.

The next four recommendations identify a framework based on principles discussed in the Dialogue that can help guide the assessment of research. Quality scope, methodology, and replicability are among some of the factors that should be utilized in this framework.

- **Recommendation 2.2** Identify research needs and priorities through adopting impartial procedures that align research and decision maker information needs, while recognizing diverse stakeholder values.



Regulators need scientific information to support policy decisions that achieve desired outcomes efficiently, while minimizing unintended consequences. Dialogue participants identified two broad tracks of research needed by state regulators of oil and gas development: impacts of oil and gas development on human health and the environment; and technologies in oil and gas that minimize impacts at different scales, from site-specific to landscape levels. To meet these needs, research agendas focused on these issues should be developed and maintained. Several recent efforts to generate research agendas relevant to oil and gas development can serve as a starting point. For example, a Special Scientific Committee convened by the Health Effects Institute (e.g., HEI 2015) developed a multidisciplinary Strategic Research Agenda to help guide future research about the possible adverse health impacts of developing oil and natural gas from unconventional resources. The Strategic Research Agenda is intended for broad use by researchers, research funders, regulators, the oil and natural gas industry, environmental organizations, public health experts, and other stakeholders.

However, such efforts do not always align with the unique set of questions and circumstances that regulators and other decision makers face. Use-inspired research, which emphasizes research and data collection that addresses practical questions of interest to decision makers and diverse stakeholders, can be a valuable tool in addressing regulatory uncertainties. Use inspired research can be particularly important for shale oil and gas development, where technology has expanded development into regions unaccustomed to its pace and scale, and where questions about its benefits and risks to human health and the environment persist.

Therefore, research agendas should be tailored to the needs of decision makers and other stakeholders. These agendas should clearly and objectively identify the questions of greatest significance and those most in need of further research. These agendas should also explicitly acknowledge the criteria for determining “significance” and “greatest need.”

Existing entities can help bridge that gap between researchers and policy-makers. For example, the Interstate Oil and Gas Compact Commission (IOGCC) regularly surveys oil and gas regulators to understand their needs. The Environmental Research

Institute of the States (ERIS), a subgroup of the Environmental Council of States (ECOS), could likewise survey environmental regulators to understand their needs. The State Oil & Gas Regulatory Exchange (SOGRE), an outreach program created under the Ground Water Protection Council (GWPC) and the IOGCC States First Initiative, could also obtain and provide valuable insights about the research needs of individual state oil and gas regulatory programs.

- **Recommendation 2.3** Accomplish priority research to ensure accountability and legitimacy.

Dialogue participants identified several broad challenges associated with funding and disseminating the results of priority research. Funders and academic journals sometimes undervalue the ability to replicate research findings. It is also difficult to get null results published. Additionally, significant sources of data or information are often presented outside of the traditional peer-reviewed academic literature. Results from unpublished research or gray literature are important because they indicate research needs that have not been focused on by academic researchers. Another issue is the increasingly polarized environment for research. Many people look at research with skepticism, suspecting political influences.

A research coordinator, who can create a process that builds accountability and legitimacy, may be a solution to the challenges inherent in developing a priority research agenda. The coordinator needs a high level of substantive knowledge and attention to detail to perform the diverse administrative responsibilities required. The coordinator also needs to be, and be seen as, impartial and apolitical, while familiar with diverse sources of knowledge and expertise on shale development issues. Another significant responsibility of the coordinator is securing support to facilitate research, which can be challenging. Governments, particularly at the federal level, sometimes allocate significant funds for research into both impact mitigation and understanding impacts, but the research prioritization process is not always transparent, and funding may be insufficient. State governments allocate minimal funds for basic research, but do fund impact research. More robust funding streams are therefore needed to accomplish priority research. The coordinator should work with diverse stakeholders, including regulators, academics, communities, and industry, to communicate prioritized research and funding needs and identify possible funding sources.

In order to secure adequate support and enhance credibility, the coordinator should make sure that funding sources are diversified and that the process is transparent. Balancing government and foundation money with industry money can provide a more robust and rigorous research platform. Oversight during the research process where possible can also help address concerns. Oversight should seek to ensure that research is proceeding as intended. If periodic checks during the research process are not possible, a rigorous independent review should occur when the research is completed but before publication.

- **Recommendation 2.4** Assess research quality standards according to scope, methodology, and replicability.

To support evidence-based decision making, research should be evaluated according to specific criteria that ensure high quality research is identified and utilized. A rigorous independent evaluation should examine at least the following features: scientific merit, the strength of findings, the relevance of findings, the transparency of reporting procedures, the interpretation of findings in light of relevant literature, adequate acknowledgment of limitations, falsifiability, and replicability. Procedural guidance can be drawn from processes established for journal peer reviews, as well as reviews by the National Academy of Sciences and the Health Effects Institute, and adapted to work in the oil and gas context.

Decision-makers should not solely rely on academic journals for information. For instance, these journals often fail to publish null results. Therefore, independent, objective assessment of research remains critically important. A number of analytical tools can help assess and extract relevant information about research methods and quality even from more informal research, including the Colorado Department of Public Health and Environment's oil and gas health assessment (CDPHE 2017) and Resources For the Future's risk matrix². In particular, Forum participants frequently raised the idea of a research scorecard to evaluate study quality using simple metrics. However, participants noted that scorecards, or any other screening tools do not fully substitute for a comprehensive and fully documented assessment.

Science Advisory Boards (SABs) can provide regulators and decision makers useful advice on the meaning and value of research. Though used in a variety of different contexts, the use of SABs by state regulators in the context of oil and gas regulation might be considered unconventional. Yet if properly structured, SABs can work impartially and transparently to provide information targeted to the needs of regulators. Ideally, the outputs of SABs are clear and explain the value of the research findings in specific contexts. While SABs do not necessarily affect the nature of research being produced on particular topics, they can offer advice on the quality, generalizability, and context. SABs are enhanced when community stakeholders are included so that local knowledge can be incorporated into the SABs' assessment of research value and applicability.

Replicability is particularly important to ensuring quality and accountability. Organizational tools help distill the qualities of research and can be further applied to make data and research methodologies and methods publicly available and able

² Alan J. Krupnick, Isabel Echarte, Laura Zachary, and Daniel Raimi, WHIMBY (*What's Happening in My Backyard?*): A Community Risk-Benefit Matrix of Unconventional Oil and Gas Development, (Resources for the Future, 2017). <http://www.rff.org/research/publications/whimby-what-s-happening-my-backyard-community-risk-benefit-matrix>

to be replicated when needed. For example, Resources for the Future (RFF) has developed a “span chart,” which summarizes a literature review of studies of the health impacts of oil and gas development in a readily accessible graphic format. The graphic is based on how many elements of the damage function model are covered by each study³. The damage function model links oil and gas activities to burdens, concentrations, exposures, impacts, and monetary values. The span chart shows that the more elements of the damage function model that are addressed in a given study, in general, the more useful the study is. Ensuring that research findings are available and reproducible is a logical step to enhance legitimacy and accountability in public decision-making.

- **Recommendation 2.5** Share research and information so that the research process is transparent and findings are accessible by all stakeholders.

All stakeholders would benefit from access to a repository of prioritized research on oil and gas development and its impacts. Various groups could potentially oversee this repository including a standing committee of the National Academy of Sciences (NAS), a research NGO (e.g., RFF), the Environmental Council of the States, and IOGCC. Because the research literature on oil and gas development is broad, there may need to be a group of repositories that coordinate their work to complement one another and encourage inter-disciplinary approaches to risk. A single entity could coordinate repositories at various organizations.

Oversight of a repository should include regular literature reviews of repository contents. Providing timely information related to new research is important because regulators and other decision-makers are increasingly expected to respond to new studies. Such reviews need to be nonpartisan, and viewed as such, as well as technically proficient, clear, and carefully documented. Funding to support a repository or system of repositories should be broad-based. The Health Effects Institute (HEI) may serve as a good model, as an institution funded by both government and industry.

ESTABLISH DEMONSTRABLE REGULATORY EXCELLENCE WHERE A PARTICIPATORY FRAMEWORK LEADS TO CONTINUAL, ADAPTIVE IMPROVEMENT OF THE REGULATORY PROCESS AND DECISIONS.

Often, regulators are caught between the oil and gas industry and local residents and expected to mediate conflicts. They may also have to contend with political pressures that can cause them to act defensively, reacting to perceived risk or conflict instead

³ Alan J. Krupnick et al., *Risks and Risk Governance in Unconventional Shale Gas Development*, (Environmental Science & Technology 2014 48 (15), 8289-8297).

of proactively seeking out information and engagement. As a result, regulators miss opportunities for learning and often struggle through situations that might be aided by the experience of other experts.

- **Recommendation 3.1** Create a community of practice to guide regulatory decisions and actions.

To increase the exchange of information between regulators and other stakeholders, a community of practice should be nurtured. Despite the heterogeneity of state experience, philosophy, and capacity, regulators from different states have much to learn from each other. A community of practice connects people with a shared discipline to learn, share knowledge and information and work collaboratively on individual, group, and organizational development. Dialogue participants felt that there could be great value in creating a community of practice to aid the process of regulatory learning, adaptability, transparency, and accountability. This community of practice could build on the work of the existing regulator associations, such as SOGRE and the States First Initiative, and others involved in the regulatory process of shale oil and gas development.

The community of practice can be used to identify and reinforce standards of excellence within agencies and across governance processes where regulators play a role. Processes have been developed in several jurisdictions to seek regulatory excellence, but the level of commitment to them – and the capacity of regulators to achieve this goal on top of other competing priorities – varies widely. To start, regulators could prioritize the recommendations from this report on stakeholder engagement and evidence-based decision-making. In particular, regulators should modify their norms of stakeholder engagement by reviewing the current stakeholder engagement processes, paying particular attention to diversifying participation and enhancing outreach, as well as improving clarity of expectations, roles, and authority. Regulators should also develop an evidence-based approach to guide their decisions. This may require modifying reporting regimes to facilitate risk identification and response and adopting adaptive regulatory frameworks that allow regulators to respond to new risks and technologies.

- **Recommendation 3.2** Establish an academy for state regulators that helps identify, share, and communicate standards for regulatory excellence across the community of practice.

Training and formal capacity building opportunities can facilitate the emergence of new norms in the regulatory community. An academy for state regulators can help implement in practice the desire to continually improve the quality of regulation and the performance of regulatory agencies. To do this, the regulatory community of practice should 1) seek necessary support for an academy; 2) ensure participant diversity including by skill set, geographic representation, and length of service in government; and 3) develop a curriculum to respond to the needs of regulators.



The academy curriculum should respond to the needs of regulators, which may adapt and change over time. At a minimum, topics should include examination of the findings, principles, recommendations, and frameworks developed by this Dialogue and challenge the participants to develop new insights about themselves and the role of leadership. The curriculum should also provide the opportunity for participants to engage in dialogue to draw upon their experiences to identify the key characteristics of regulatory excellence that are most salient for each participant. Additionally, the curriculum should:

- o Emphasize new and emerging technical topics.
- o Identify best practices in stakeholder engagement and data-driven decision making.
- o Identify shared procedures for improving knowledge management and collective learning that promote innovation and incorporate change.

Participation in the academy should be open to veteran and less senior state regulators responsible for implementing or enforcing laws impacting oil and gas development. Including less senior regulators will capture individuals at an inflection point in their careers, where peer to-peer learning opportunities and dialogue are particularly valuable, and a community of practice can be developed. In addition, the participants should span a diverse range of expertise and experience, including from the following disciplines: environmental science, engineering, technology, economics, public health and safety, law, and policy. Participants should also include regulators from several different jurisdictions. Despite varied mandates and institutional structures, regulators share common challenges regarding oil and gas development. Including veteran regulators will foster mentoring opportunities and ensure organizational buy-in.

- **Recommendation 3.3** Connect the academy with existing regulatory training and information initiatives to expand the community of practice.

As the academy grows in popularity, stature, and resources, consideration should be given to expanding its participation in some programs to include stakeholders beyond state regulators. This would help build a broader community of practice.

While the academy could eventually become a larger effort, the initial idea is focused on creating the opportunity for state regulators from multiple regulatory agencies involved in oil and gas development to develop skills and learn from one another.

Integrative entities and organizations such as the IOGCC, GWPC, the States First Initiative and its State Oil and Gas Regulatory Exchange (SOGRE), and TOPCORP should support the creation of this academy for regulators. The academy would support their organizational efforts to ensure that states and provinces serve as leaders in the development of oil and gas resources through sound regulatory practices that protect public health and the environment. The academy would offer educational programs and dialogues designed to provide participants with knowledge about emerging trends, lessons learned, and best practices from other jurisdictions working on similar issues. It would also provide assistance to further enhance current programs or initiate new ones. Support, financial and otherwise, by these integrative efforts and organizations would provide an important signal to regulators that the academy is worthy of their support and participation.

While federal governments may not always have the financial resources to fully support the academy, and securing available financial support may take significant time and effort, other kinds of support at the federal level can still provide significant credibility. The US federal government has, for example, recently supported other initiatives intended to recognize states as leaders and innovators in oil and natural gas regulation. It has also supported efforts to facilitate collaboration and communication on best practices and innovations, procedures, and protocols among states, such as the State Review of Oil and Natural Gas Environmental Regulations (STRONGER), and the States First Initiative of the IOGCC and the GWPC. This academy would likewise emphasize the important role of state and provincial regulators, and provide opportunities for them to learn from one another and improve their skills. This may reduce the need for additional federal regulation, oversight and resources. Support, financial and otherwise, of the academy from federal government sources would provide an important signal that the academy is worthy of support and participation.

APPENDICES

APPENDIX I: ACTION AREA DISCUSSION SUMMARIES

*A draft version of this report was distributed to participants of the **Aspen Institute Forum on Energy and Governance**, a larger meeting of stakeholders and experts in shale governance which included several Dialogue participants. During the Forum, discussion groups were held to discuss in depth the three action areas highlighted in this report. Building off the report, participants expanded on the aspects of each action they found most compelling.*

Action 1 Discussion Group: Develop and maintain reliable, use-inspired research where regulators and other decision-makers can access information

Regulators of shale oil and gas don't have the time to sift through thousands of studies in order to find existing information pertinent to their decisions. **Therefore, priority issues for regulators should be isolated and compiled, and existing research on these topics should be collected, synthesized, and distributed back to regulators.** There is an IOGCC project that is about to begin that will poll members on their priority issues. After polling is complete, the IOGCC will reach out to oil and gas engineering-focused bodies to compile relevant information, research, and data. The IOGCC will then organize this information to be sent to regulators. Other organizations could also engage in similar activities, for example ECOS could do provide a similar service to environmental regulators.

There are also many areas in shale oil and gas development important to regulators where research does not yet exist. **The work of state universities could be better matched with research priorities articulated by state agencies.** Instead of informal communication practices between state agencies and state universities, these interactions could be formalized. State regulators could come to universities with a research agenda, data, and fundraising support. Partnerships between state regulators and universities could help unlock state, federal, and private money for research.

In addition, **a compelling research agenda that comes from the states could be developed and communicated to federal or private funding sources.** The IOGCC, GWPC, or ECOS could help develop this agenda by compiling unmet state research needs through polling, building off the IOGCC's current project on polling state regulators and supplying existing information. This agenda and

research funded by federal or private sources could help fill in gaps not being met by universities.

Collecting research priorities, compiling and distributing existing research, and creating agendas for new research is a complicated set of tasks, and should be coordinated. The academy referenced in the Dialogue Report could act as a coordinating institution. Regulators could discuss what they need to know, create priorities, and learn what is already out there as part of the curriculum. It could host the information “repository,” collect new information, and even potentially sift through literature and provide judgements on research for regulators. The academy might be the central location for coordination and dissemination itself, or could be the hub of a network of institutions which perform these functions.

To enable these activities to take place, **novel and credible research funding mechanisms should be developed.** Private sector funding is one possibility, and combining industry associations and individual companies to fund research of mutual interest is one strategy to explore. A small severance tax directed toward research that would be useful both to citizens, government, and industry is another possibility. In all cases, maintaining credibility of research is important, and so combining public and private funding is a useful strategy.

Action 2 Discussion Group: Create effective, early engagement between the various actors and systems in shale development

There are several different variations of stakeholder engagement that are important to address: stakeholder engagement by industries in the communities where they operate, stakeholder engagement by regulators when making rules and issuing permits, and the broader level stakeholder engagement across multiple actors. Each of these categories is distinct, though lessons can be drawn across all three.

Communities experiencing new or more intense shale development often question whether or not the development should take place. However, by necessity, they are excluded from being a part of that decision. In addition, communities are often not asked what they want and need to know in the process of development, and their access to decision makers is through rulemaking, permits, and the complaint process. In parallel, industry doesn't have a say in whether new subdivisions are built or if communities expand closer to development sites. Given these realities, **dialogue between all stakeholders is important in the process of governance.** While everyone may not be happy with every outcome, the process of getting to the outcome should be perceived as fair.

Some participants felt that many who oppose shale oil and gas development are opposed to the perception of what is being done, but not actually what is being done. Therefore, an effort to educate and inform stakeholders about the industry

itself is needed. Tools for integrating industry, regulators, NGOs, and others into partnerships that can build education and training programs together should be developed. Systematically working with organizations widely viewed as credible by both industry and communities, like EDF or NRDC, to try to set a baseline of facts about shale oil and gas development could be a helpful aspect of engagement for industry and regulators. **However, engagement should not be a one-way flow of information.** It is important to ask communities and stakeholders what they need and what they want to know.

In addition, participants discussed the **importance of context**. There is variability across governments, states, communities, and risks. **Engagement should to be designed specifically for each community.** A one size fits all approach to engagement will not work, though lessons learned can still be instructive. The ability of industry to go into a community and work with leaders on a community's specific concerns eases tensions and fears. It is also important to think beyond the localized impacts of oil and gas to a broader set of actors and circumstances. For example, NGOs play a large role developing public perceptions of shale resource development. In addition, the history of oil and gas production in the US should not be forgotten. Cycles of oil booms and busts are familiar to many communities. Money and politics also play an important role in the backdrop.

In the context of stakeholder engagement, **more time could be spent on building from past experiences.** Regulators, industry and other stakeholders all likely have experiences to share. Starting a database of tested strategies, tools and mechanisms for public engagement would be useful and could help improve future engagement. The Public Outreach Committee of the IOGCC or the National Academies of Public Administration might be good host organizations for this database or other programs to encourage knowledge sharing. Alternatively, a master's student might make this their project.

Action 3 Discussion Group: Establish demonstrable regulatory excellence that leads to continual, adaptive improvement of the regulatory process and decisions

The Academy on Regulatory Excellence and Leadership would focus on social sciences to help regulators engage with stakeholder communities. The curriculum of the academy would establish a demonstrable, participatory regulatory excellence framework to discuss governance, regulatory excellence, leadership, and how regulators can improve current practices. The academy would include adaptive and continuous improvement, and a well-built participatory concept. The goal of the academy would be: 1) to discuss the systems that limit regulatory actions, 2) to provide the latest social science to help guide how regulators respond to governance issues and set goals for adaptive governance.

The academy would not necessarily be limited to oil and gas regulators, and would aim to engage both junior and senior-level participants, possibly including representatives from industry. The academy would be a useful tool to inform current regulators and prepare the next generation of thought-leaders. A certification or credit-earning process could be incorporated in the academy for regulators, as no certification process currently exists for regulators.

Format Suggestions

The academy could be held as a pilot program for a half-day event before or after IOGCC Meetings to gauge interest from regulators. The pilot program could present the mission statement of the academy and give regulators a sense of the curriculum on governance and leadership and the value of participating.

Another option for the academy is an onsite, two-day foundational course on governance and leadership for those who are more nascent in their careers, followed by a five-day course of study for junior and senior-level participants. After the onsite meeting, online workshops would be held with content based on participant feedback from the course. There could also be an opportunity to focus more closely on shale development for those in the space.

The academy could be hosted in a state and held with neighboring states to provide a more convenient location for regulators to convene and could offer department-wide training for officials. The academy would support efforts to ensure that states take a leading role in developing the curriculum.

Another component of the academy could be a leadership development and awareness training for mid career professionals. The training could be modeled off the Aspen Institute-Rodel Fellowship in Public Leadership, which selects emerging leaders to explore values and leadership, relationships with stakeholders, and responsibilities of public leadership.

Possible funding for the academy could originate from the federal government, states, foundations, private sector, or registration fees from attendees.

The academy curriculum would discuss topics such as: *History of Regulation, Economics 101, Theories of Governance, Community Stakeholder Engagement, Risk Assessment/Science Assessment, Applied Civics and Political Science, Institutional Theory and Network Analysis, Federalism to the Local Level, Crisis Communication and Management, Processes of Continual Improvement and Adoptive Management, The Rise of Administrative State and Law.*

APPENDIX II: DIALOGUE PARTICIPANTS

Following are the participants who took part in the Aspen Dialogue on Energy Governance. The participants took part in their individual capacity and their titles and affiliation are included here for identification purposes only. Their organizations are not responsible for the views or other content of this report. In addition, not all views expressed in this report were unanimous; not all comments represent the aim or outcome of the meeting. Participants were not asked to agree to the wording of this summary and, therefore, speakers and participants are not responsible for its contents.

Scott Anderson

Senior Policy Director, Natural Gas
Environmental Defense Fund

Kip Averitt

Consultant
Averitt & Associates

Bruce Baizel

Energy Program Director
Earthworks

Jim Bolander

President
JLB Engineering, LLC

Robert Bruant

Product Director
B3 Insight

Maggie Carroll

Program Manager,
Energy and Environment Program
The Aspen Institute

Cary Coglianese

Director, Penn Program on Regulation
Edward B. Shils Professor of Law and
Professor of Political Science
University of Pennsylvania

Sinziana Dorobantu

Assistant Professor, Department of
Management and Organizations
NYU Stern School of Business

Claudia Emerson

Director, Institute on Ethics & Policy
for Innovation
McMaster University

Kudjo Fiakpui

Director, International Relations
Alberta Energy Regulator

Blair Fitzsimons

CEO
Texas Agricultural Land Trust

Joseph Fitzsimons

Partner

Uhl, Fitzsimons, Jewett & Burton,
PLLC

Greg Gershuny

Interim Director,

Energy and Environment Program
The Aspen Institute

Anna Giorgi

Assistant Director, Environment
and Climate

Energy and Environment Program
The Aspen Institute

Louis Harveson

Endowed Director of BRI and Professor
of Wildlife Management
Sul Ross State University

Patricia Moody Harveson

Associate Professor of Conservation
Biology
Sul Ross State University

Marilu Hastings

Vice President, Sustainability Programs
The Cynthia and George Mitchell
Foundation

Tanya Heikkila

Professor, School of Public Affairs
University of Colorado (Denver)

David Iannelli

Partner

Hudson Pacific

Shawn Kessel

City Administrator

City of Dickinson, ND

Joe Kiesecker

Lead Scientist & Director,

Development by Design

The Nature Conservancy

Kate Konschnik

Director, Climate and Energy Program

Nicholas Institute for Environmental
Policy Solutions, Duke University

Alan Krupnick

Senior Fellow and Co-Director, Center
for Energy and Climate Economics
Resources for the Future

Matt Lepore

Strategic Advisor and Legal Counsel

Adamantine Energy

Colin Leyden

Senior Manager, State Regulatory &

Legislative Affairs – Natural Gas

Environmental Defense Fund

Joe Lima

Director, Environmental Sustainability

Schlumberger

Evan Michelson

Program Director

Energy and Environment Program

Alfred P. Sloan Foundation

Marita Mirzatury

Senior Sustainability Program Associate

The Cynthia and George Mitchell

Foundation

David Monsma

Former Vice President

Former Executive Director,

Energy and Environment Program

The Aspen Institute

Richard Newell

President
Resources for the Future

Timothy Olson

Former Senior Program Manager,
Energy and Environment Program
The Aspen Institute

Amy Pickle

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

Daniel Raimi

Senior Research Associate
Resources for the Future

Martha Rudolph

Director, Environmental Programs
Colorado Department of Public Health
and Environment

Melinda Taylor

Director, Kay Bailey Hutchison Center
for Energy, Law, and Business
UT Austin Law

Michael Teague

Former Secretary of Energy
and Environment
State of Oklahoma

Scott Tinker

Director, Bureau of Economic Geology,
Jackson School of Geosciences
The University of Texas at Austin

Donna Vorhees

Director of Energy Research
Health Effects Institute

Gabrielle Wong-Parodi

Assistant Research Professor,
Center for Climate and Energy
Decision-making
Carnegie Mellon University

Lori Wrotenbery

Former Director, Oil and Gas Division
Railroad Commission of Texas

Michael Young

Associate Director,
Bureau of Economic Geology
UT Austin

Ali Zaidi

Former Associate Director,
Natural Resources, Energy and Science,
Office of Management and Budget,
Executive Office of the President

