Managing risks from shale gas development using innovative legal and regulatory approaches

Sheila Olmstead and Nathan Richardson

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RESOURCES FOR THE FUTURE

Framing the question of risk governance

- RFF expert survey suggests:
  - Significant consensus over which risks are high priorities for further industry/regulatory action.
  - Little agreement about whether industry or regulators should take the lead in mitigating risks.
- The public almost certainly has some ambivalence about the appropriate sharing of responsibility, as well.
- Given these views, political gridlock, budget deficits, emergence from recession: choice of innovative, cost-effective policy instruments to address environmental risks from shale gas development is very important.

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What we do in this paper

- Review two categories of innovative approaches that can be used to regulate environmental risks:
  - liability rules
  - market-based regulations
- Discuss theoretical advantages and disadvantages.
- Identify actual and potential applications to the regulation of risks from shale gas development.

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Deciding between liability and regulation (Shavell 1984)

- Information – do private parties or regulators have more information?
- Ability to pay – can defendants escape liability through lack of resources?
- Threat of suit – can those suffering harms sue those responsible and have a chance of winning?
- Cost – how do total costs of the two approaches compare?

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Liability vs. regulation and shale gas risks

- Widespread harms (e.g., air, surface water pollution) are hard/costly to address through liability system; this is rationale for much environmental regulation, and probably just as relevant to shale gas risks.

- But liability fills gaps left by regulation and may be best fit for some risks to landowners and the community.
  - Truck accidents
  - Damage to property from drilling activity
  - Private groundwater well contamination

- How to address challenges for liability from among Shavell's criteria?

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Tools for dealing with information asymmetry in the liability system

- Disclosure rules – fracking fluid chemicals
- Strict liability – removes need to prove negligence, so less info needed, but could lead to less drilling without changing level of care.
- Burden shifting – e.g. PA pre-drill testing law. Drillers don't have to test, but if they don't any groundwater contamination is presumed to be a result of nearby drilling.

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Tools for addressing ability to pay

- Insurance/bond/financial responsibility requirements can mitigate this issue.
  - Bond requirements exist, but tend to be low, insufficient to cover significant damage.
    - e.g., PA - $2,500/well, or $25K for all wells in the state.
    - As of July 2013, only 8 states have bonding requirements > $50,000/well (Environment Ohio 2013).
    - An exception: NY $250K/well.
- In contrast, liability limits effectively make all operators judgment proof.

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Tools for increasing threat of suit, reducing costs

- Increasing threat of suit:
  - Largest problem here is widespread harms. Policy can't do much to change that.
  - Reducing class action barriers strengthens liability approach.
- Reducing litigation costs:
  - Many measures discussed above (information disclosure, class action) reduce litigation costs, as well.
  - Other options include specialized courts, having adequate judges & resources to manage caseloads.

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What about administrative regulation? Many different policy instruments – we cover:

- **Prescriptive approaches**
  - Technology standards
  - Performance standards
    - Uniform
    - Non-uniform

- **Market-based approaches**
  - Taxes
  - Environmental markets
  - Information disclosure policies

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Defining Prescriptive Regulation

- Directly prescribes the behavior or performance of individual firms or facilities ("command-and-control").
- ***Technology standards*** specify particular technology that must be used to achieve compliance.
  - CAA 1977 Amendments required flue gas desulfurization devices (scrubbers) on new power plants.
  - State oil and gas regs often require minimum well setback from streams, or a particular type of cement in well casing.

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Prescriptive Regulation, cont.

- ***Performance standards*** – set forth a general standard, without specifying how it must be achieved.
  - Min. energy efficiency requirements, max. emissions rates per unit of time or output.
  - Could require that a pressure test on cement casing not exceed a particular level, without specifying cement type.
  - Can be uniform, or differentiated.

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Prescriptive Regulation, cont.

- Performance standards are better in theory than technology standards at minimizing the sum of emissions control costs and pollution damages (Besanko 1987, Bennear and Coglianese 2012).

- Since 1990s, presidential executive orders have asked federal regulatory agencies to choose performance over technology standards wherever possible.

- Nonetheless, a negligible fraction of CAC regulations governing shale gas development risks are performance standards.

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CAC Shale Gas Regulations Tend Toward the Most Prescriptive End of the Spectrum.

- Examples at the federal level:
  - BLM's proposed rules for hydraulic fracturing on federal lands require operators to maintain specific types of logs and meet specified well construction standards.
  - EPA's anticipated (2014) regulations regarding pretreatment of shale gas waste will likely use technology standards.
- Among the 27 states and 20 regulatory elements tracked statistically in RFF's review of state shale gas regulations, 81% of observed regulations were CAC policies *other than* performance standards.

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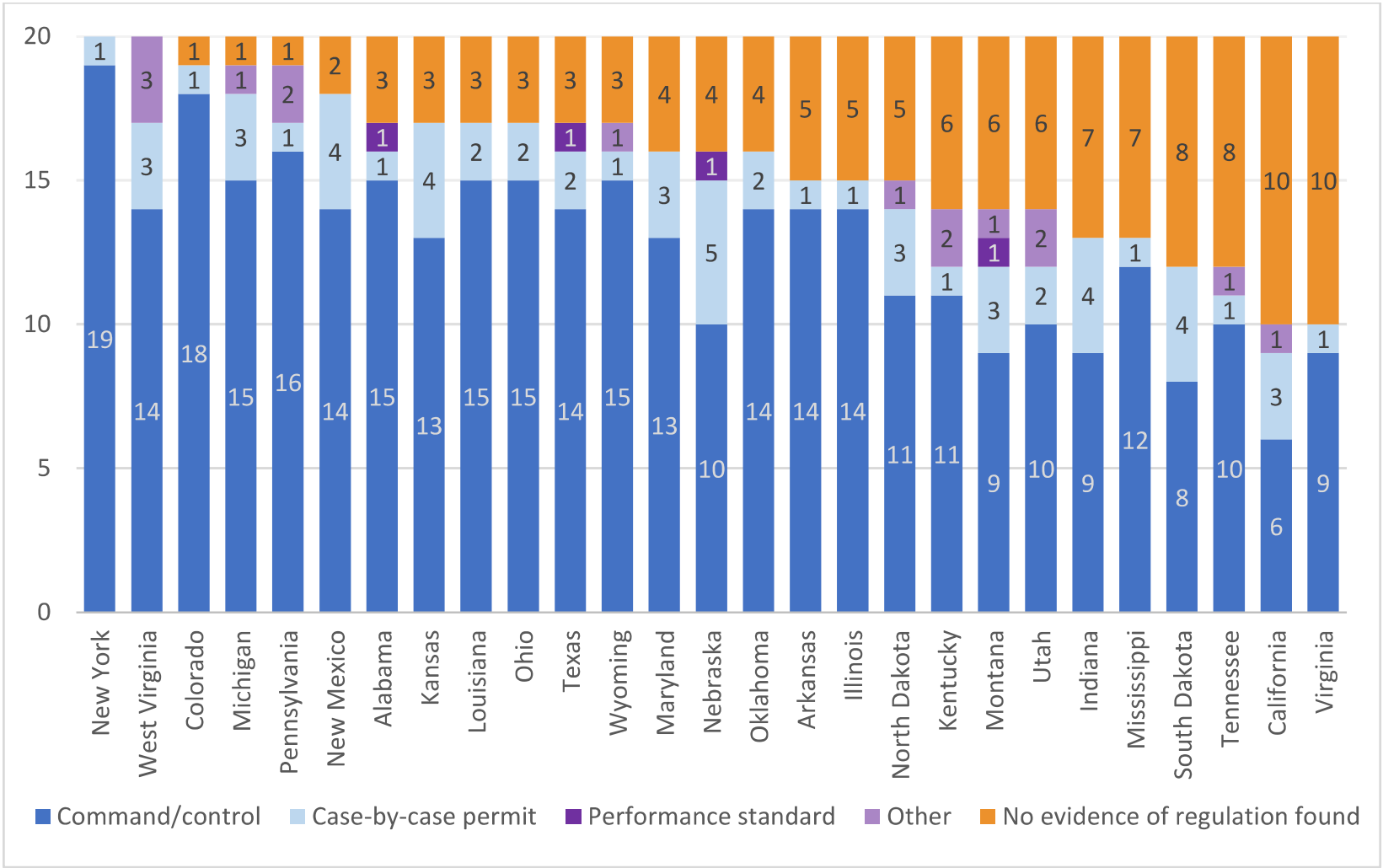
State Regulatory Tools Regarding Shale Gas Risks



Source: Richardson, N., M. Gottlieb, A. Krupnick, and H. Wiseman. 2013. *The State of State Shale Gas Regulation*. Washington, DC: Resources for the Future, p. 15.

Real Performance Standards for Shale Gas Risks are Hard to Find.

- Only four states (AL, MT, NE, TX) appear to use actual performance-based regs – all related to well integrity.
  - AL regulates casing/cementing depth in this way.
- Some regulations are called performance standards, but they really don't meet the definition.
  - EPA's 2012 New Source Performance Standards for oil and gas wells are generally achievable with a single technological approach, "green completion".
- Others are so vague that they don't represent enforceable rules.
  - Some state regs require operators to avoid venting and flaring of methane when it "creates a risk to public health," with no further guidance.

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Summing up prescriptive regulations and shale gas

- Almost all regulations related to environmental risks of shale gas development are prescriptive.
- And almost all of these are on the most prescriptive end of the spectrum (technology standards, rather than performance standards).
- Reflective of U.S. environmental, health and safety regulations, more generally.
- Suggests potential for cost-effective changes in the choice of policy instrument could be very significant.

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Moving on to market-based approaches

- Challenges to policy approaches even more innovative than performance standards may be significant.
- But potential advantages of flexible approaches are very strong.

The New Yorker, December 2011

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Defining market-based regulation

- Targets aggregate or market-level outcomes, rather than the activities of individual facilities, choosing flexible policy instruments to achieve these outcomes.
  - Taxes
  - Environmental markets (e.g., cap-and-trade programs)
  - Reduction or elimination of subsidies
  - Deposit-refund systems
  - Mandatory information disclosure policies
- More cost-effective than CAC regulations in theory (Baumol and Oates 1971; Bohm and Russell 1985; Crocker 1966; Hahn and Stavins 1992; …) and in practice (studies of SO2 trading, phasedown of lead in gasoline, …).

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Environmental taxes and shale gas risks

- Pollution tax is the classic example, but not used in federal or state shale gas development regulations.
  - True more generally, as well; unit pricing schemes for solid waste disposal may be only real U.S. example.
  - European and developing countries have experimented more broadly (Stavins 2003).

- Severance taxes, however, are extremely common.
  - Imposed on gas production in 26 out of 31 states considered in the state shale gas regulatory review of Richardson et al. (2013).

- Are oil and gas severance taxes “environmental taxes”? If not, could they be?

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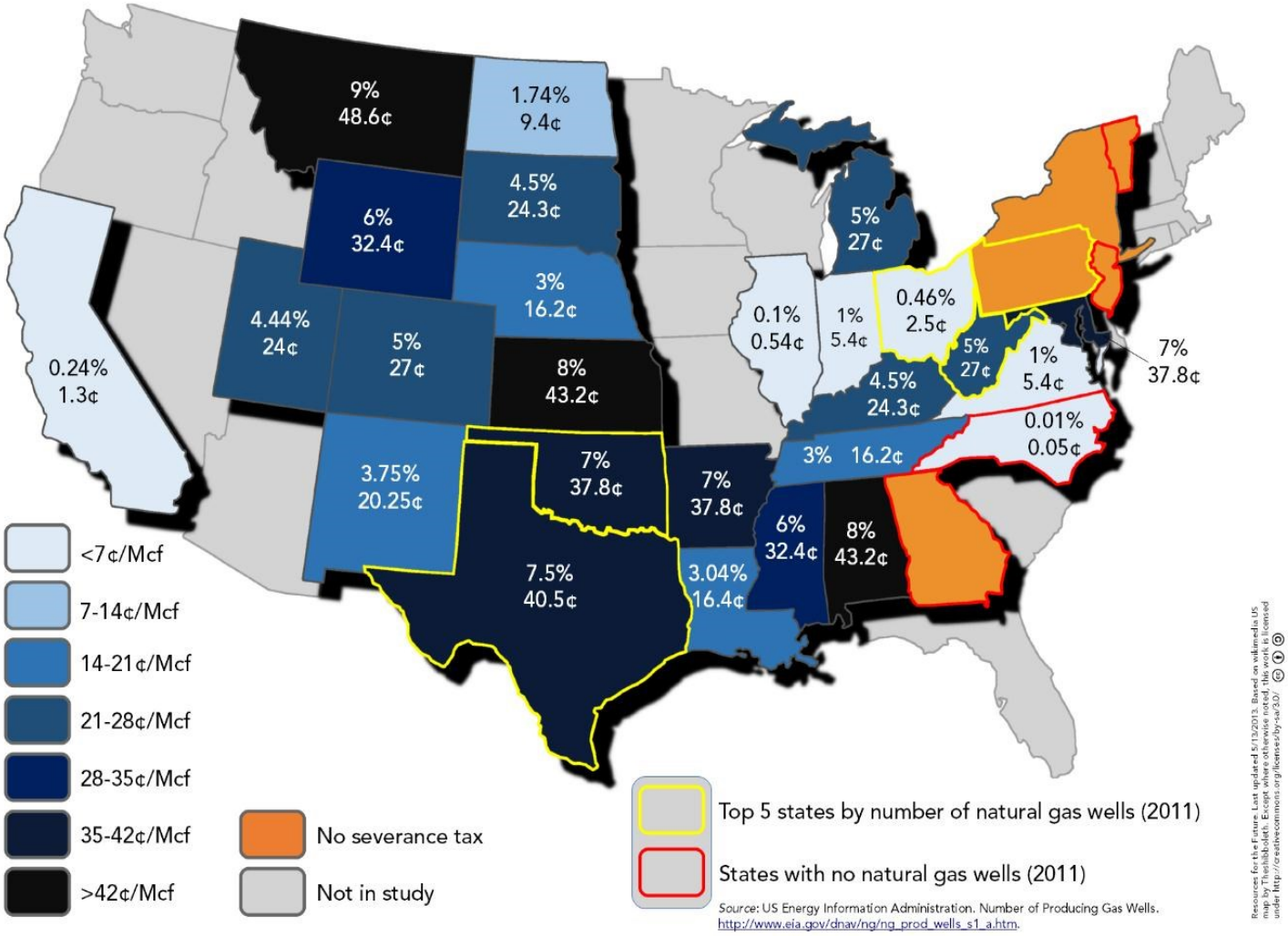
Severance taxes and shale gas



Source: Richardson et al. (2013), p. 66, Map 21.

Severance tax as an environmental tax

- Primarily a revenue-raising tool in oil and gas states.
- But can also capture “rents” from depletion of a non-renewable resource – “as if” endowment to make up for the fact that gas extracted today is not there tomorrow.
  - Can be used to smooth “boom and bust” cycles generating community impacts.
  - Potential funds to remedy environmental harms (Gulley 1982).
- Since these taxes vary with production (or the value of production), could also, in theory, incorporate negative production externalities, such as methane emissions.

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Two caveats about the severance tax

- U.S. severance taxes have little impact on producer behavior at current levels; simulation studies suggest production is inelastic to even large changes (Kunce 2003, Chakravorty et al. 2011).

- Even if a tax on production does change behavior, it may not target the most significant potential risks from shale gas development.
  - Doesn't target site preparation risks (habitat fragmentation from infrastructure placement).
  - Drilling/completion risks (conventional air pollution emissions and congestion from truck traffic, surface water risks from impoundments, etc.) may not vary with production.

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What about impact fees?

- Pennsylvania's "unconventional well fee" created in 2012 – counties/municipalities may vote to adopt.
  - Depends on gas price in year of production, but not on production level.
- Impact fee approach could be used to address "fixed external costs" of shale gas well development.
  - Could vary spatially (higher fees in or near more sensitive habitat).
  - Could vary over time (higher fees as land footprint of shale gas development consumes a greater fraction of formerly open space, increasing the marginal value of remaining open space).

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Environmental markets and shale gas risks

- Cap-and-trade programs are the classic example, though they are not being used specifically to address shale gas development risks.

- However, some existing programs may be relevant (or made relevant) to shale gas operations:

  - NOx Budget Trading Program under the CAA

  - Water quality trading programs under the CWA, for contaminants such as sediment or TDS, where they co-exist in watersheds with shale gas activity

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Role of Markets for water *quantity*

- Water rights leases and transfers are already relevant to shale gas development in arid western states.
- Mitigates risks related to competition for scarce water.
- Increasingly common trades between farmers and cities (Brewer et al. 2008) may provide a template.
- Small number of trades already between farmers and energy developers (oil, not gas, to our knowledge) in ND, CO, UT (Western Governors' Association 2012).
- Dealing with third-party impacts will be important.

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Information disclosure regulations

- Lots of theoretical, empirical work on these policy instruments, and solid evidence that they can affect consumer and producer behavior under certain circumstances.

- Obvious example in shale gas development context is disclosure of fracking fluid contents, required by 15 states, and by the U.S. Department of the Interior for hydraulic fracturing operations on public lands.

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Will fracking fluid disclosure have an impact?

- Potential direct impacts on operator behavior?
  - Experience with the U.S. Toxics Release Inventory (TRI) is instructive.
  - Won't be possible to assess impact on operator behavior (choice of chemicals, other outcomes) because no data on contents before disclosure was required, and no data from firms from whom disclosure is not required.
  - Looks like it would be harder to engage in regulatory avoidance with fracking fluid disclosure than with TRI – no thresholds, no "listed" chemicals.

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Will fracking fluid disclosure have an impact?

- Potential impacts on shareholder/consumer behavior?
  - Shareholders – possibly. TRI (warts included) has had demonstrated impacts. Could potentially do an empirical analysis of this now: look for stock price impacts using data from FracFocus. Could then influence producers (as w/TRI).
  - Consumers – our view, not backed by empirics, is that this is unlikely.
    - Compare FracFocus with scorecard.org for TRI
    - Households can generally only purchase gas from a single supplier (and unlikely to fuel switch in response to disclosure)
    - Industrial customers unlikely to have preferences over how gas input is produced (and may also be constrained to a single supplier).

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Conclusions

- Currently lots of critical thinking (by feds, states, river basin commissions, and others) about whether a risk needs new government action to control it and how stringent that action should be.

- However, much less critical thinking about what tools are best used to address a given risk.
  - Liability system vs. regulation
  - If regulation, what policy instruments – are there opportunities for innovative approaches?

- Given big differences in effectiveness, costs of these different tools, the time is right to move the discussion toward policy approaches.

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Thank you!

sheila.olmstead@austin.utexas.edu,
richardson@rff.org

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Recent RFF research on shale gas risks

- Alfred P. Sloan Foundation funded a five-part project, July 2010 – June 2013.
  - Expert survey to identify high-priority risks from routine shale gas development, as well as accidents.
  - Household survey to assess individuals' willingness to pay (e.g., higher energy bills) to mitigate potential risks.
  - Statistical analyses of selected high-priority risks from the expert survey.
  - Comprehensive mapping and analysis of state regulations related to shale gas development.
  - Synthesis report and recommendations.

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RFF expert survey on shale gas development risks

- Surveyed 215 experts:
  - NGOs (35): Most national environmental groups, some local
  - Academics (63): Universities/think tanks
  - Government (42): Federal agencies; about half the relevant states; river basin commissions
  - Industry (75): Operating and support companies, trade associations, consulting firms, law firms

- Respondents identified “high priorities” for further industry/regulatory action from among 264 possible environmental/community risks.

- See www.rff.org/shaleexpertsurvey

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RFF Expert Survey Results: Who should take the lead in addressing risks?

- In a more general question earlier in the survey, shared responsibility was an allowable answer.
  - All groups agreed that government and industry should share the authority for risk mitigation, to some degree.
  - Nearly ½ of industry experts say that industry should take a leading role in a sharing arrangement; no more than ⅓ of any other group took this position.
- Support for government as the primary responsible party was strongest for air pollution and habitat protection, treatment of wastewater – much less for community disruption impacts.

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