

Examining the Advocacy Coalition Framework for Insight into Shale Gas Development in US and UK Political Systems

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Abstract: The project considers the Advocacy Coalition Framework from the discipline of policymaking which is used to examine contentious and politically complex policy issues, particularly in energy and environmental development and planning. Shale gas development in the United States has been noted for its dramatic economic and political effects, leading some countries to pursue development of their own shale resources. The United Kingdom's tentative steps into the industry have engendered efforts to understand American experiences and conceptualize how their own country may or may not accommodate such development. The project attempts to highlight the current or potential issues or benefits entering the discourse and extrapolate insights from the Advocacy Coalition Framework to enhance and inform shale gas development as a social issue in addition to existing as an economic or technological disruption. Thoughts on attitudes between disciplines tangent to shale gas development are also expressed.

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Introduction

In 2013, The British Geological Survey presented updated assessments that the Bowland-Hodder shale play in the North of England has a range of 822 trillion cubic feet to 2281 trillion cubic feet in shale resources (Andrews, 2013). Though technological and economic constraints have yet to be applied to this resource estimation, this shale play has the potential to dramatically alter the United Kingdom's energy mix and security should the nation move to a large-scale operations phase. This possible energy resource has elicited pushes of support, opposition, or caution among the British government, industry, academia, environmental groups, and the general public. The United Kingdom's lack of experience in accessing shale gas, considered an unconventional natural gas resource, requires a thorough examination of shale gas development in regions that have experienced such development.

The United States serves as the primary national example of full scale shale industry, which has been operating in earnest since the late 2000s. However, the experiences within the United States are far from uniform. Because the industry is generally regulated at a state level, it is possible to break the industry into a number of case studies and examine the dynamics of various actors (regulatory bodies, industrial players, members of society) in states that have differing levels of economic dependence on the energy or extractive industries; such studies could highlight how opportunity or risk is perceived, and the level of individual or coordinated interventions involved. The technological success of accessing previously uncommercial shale resources has been noted all over the world, and while there are some promising resource estimates in other countries, various roadblocks and conditions may inhibit the development of shale gas industry beyond the exploration phase. This project considers some factors that may affect the development of shale

gas industry in a given region, namely in shale gas producing American states and the fledgling exploration activities occurring in the United Kingdom.

This project considers the Advocacy Coalition Framework (ACF) (Sabatier P. , 1988) from the adjacent discipline of political science that includes economic or environmental or engineering analysis as components of a framework that draws theoretical insights from other social science disciplines. In particular, the ACF is considered because of its applicability to policy issues that are especially complicated or politically contentious; the inclusion of technical information as a vital factor appears especially relevant, as both media coverage and scholarly literature address the many points of debate within both economic and environmental contexts, the details of which are hotly contested from value preference, theoretical, and empirical standpoints. The project mines literature concerning both theoretical and empirical experiences using the ACF and addresses some limitations or needs for refinement, in general, that have been voiced regarding the framework and discusses potential applicability and insights the framework may have for defined US and UK political systems experiencing past or future development of shale gas industries.

The project's primary objectives are to highlight potential issues or opportunities with respect to shale gas development and, in so doing, better comprehend the topic as a social issue. This project will examine several of these conditions, whether economic, environmental, geological, or political, that potentially make or break the development of shale gas resources. Factors similar to these are often threaded into analyses of the ACF methodologies employed by public policy researchers in energy or environmental studies.

The Advocacy Coalition Framework: An Overview

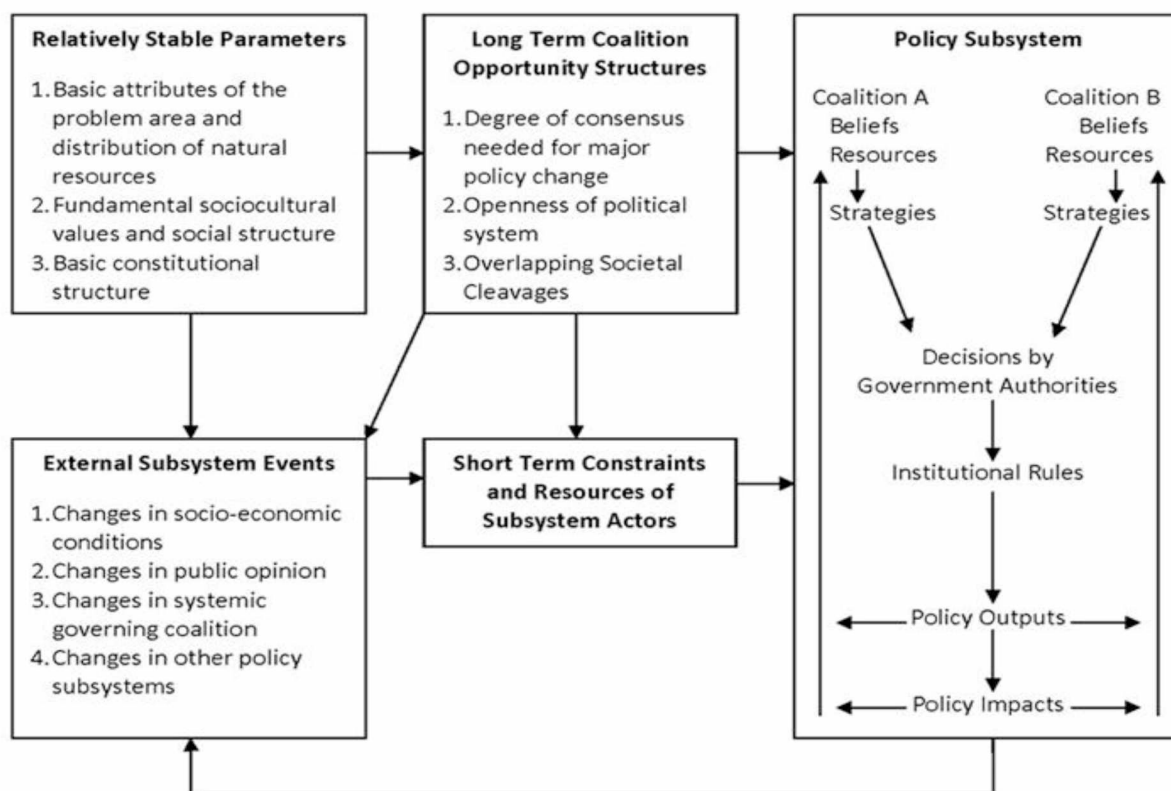
Recent scholarship in public policy research has seen an increase in theory development and applied studies using the ACF to achieve more nuanced understanding of policy processes. The ACF is considered both a “bottom-up” and “top-down” approach; its sector-based focus is designed for a better capture of complex processes and interactions between relevant coalitions involved in particular policy change but it also considers effects from higher levels of government (Cairney, 2015). First introduced in 1988 (Sabatier P. , 1988), the ACF periodically undergoes revisions to theoretical and empirical aspects; initially applied for pluralist/federalist subsystems, particularly the United States, there have been concerted efforts to adapt it to Westminster and other political subsystems (Weible & Sabatier, A Guide to the Advocacy Coalition Framework, 2006). This framework is especially applied for policy issues comprising a complex mix of motivated actors (who form coalitions) and levels of government; uses of the ACF range from energy and environmental issues to health and social policies. Generally, the framework pulls from elements of psychology and other behavioral sciences and improves upon the previous paradigm of the stages heuristic, which tended to see policy making as a cycle of stages and lost its luster in the discipline as researchers sought approaches that were less simplistic and offered better explanatory power (Weible & Sabatier, A Guide to the Advocacy Coalition Framework, 2006).

Basic assumptions of the ACF are as follows (Sabatier & Jenkins-Smith, The Advocacy Coalition Framework: An Assessment, 1999):

- 1) The policy process is strongly influenced by technical information, as such information is involved in learning and is considered by actors in decision making.

- 2) At least ten years are required to understand policy change and outcomes.
- 3) The primary unit of analysis is the policy subsystem, which includes the topic, geographic scope, institutional structure, and actors involved, rather than a single program or government entity.
- 4) Officials from all levels of government, the media, scientists, and other professionals are included in the analysis, moving beyond the classical “iron triangle” relationships, which only considers a limited number of actors (Congress, bureaucracy, and interest groups) at a singular level of government.
- 5) Policies are translations of beliefs.

Figure 1: Theoretical Structure of ACF (Weible, Sabatier, & McQueen, Themes and Variations: Taking Stock of the Advocacy Coalition Framework, 2009)



Policy Subsystems

Policy subsystems involve a defined geographical and institutional scope in which advocacy coalitions competitively interact to influence policymaking; common beliefs drive coordination among actors and coalitions may be comprised of government officials, members of non-governmental organizations, universities, media, or trade bodies. Relatively stable parameters

structure the nature of the problem, constrain the resources available to policy participants, establish the rules and procedures for changing policy and reaching collective decisions, and broadly frame the values that inform policymaking (Weible & Sabatier, A Guide to the Advocacy Coalition Framework, 2006).

Natural resources, governmental structure, and cultural attitudes and norms are unlikely to change over a very long period of time. As such, efforts by actors are generally not directed to these parameters (Weible & Sabatier, A Guide to the Advocacy Coalition Framework, 2006). A fairly long timeframe is required (typically 7-10 years) for a subsystem to mature, or experience a policy cycle; during this time a feedback learning effect occurs and there is sufficient presence and expertise of experienced actors at all levels of government concerned with the defined problem (Advocacy Coalition Framework Overview, 2014).

Avenues of Policy Change

The primary goal of the ACF is to make sense of policy change; change occurs through inter- or intra-coalition learning effects, a “hurting stalemate”, or external or internal shocks (Weible & Sabatier, A Guide to the Advocacy Coalition Framework, 2006). Belief systems are the cornerstone of this framework; individuals are assumed to operate within a hierarchy of beliefs, which include *deep core beliefs*, which refer to ingrained, elemental philosophical notions, such as position on a political spectrum (e.g. liberal or conservative) or basic values and exist across more than a particular policy subsystem. *Policy core beliefs* concern an actor’s value preferences

in the defined policy subsystem (e.g. government power distributions and jurisdictions or preferences in basic market structures) and while this level of beliefs is more likely to change over time, they are still fairly rooted and unyielding. Finally, *secondary beliefs* refer to the specifics of the policy itself (e.g. particulars of funding or utilization efforts) and are the most changeable level of beliefs (Cairney, 2015; Sabatier P. A., Theories of the Policy Process, 2007). The learning process in the ACF is filtered through belief systems, which typically results in the rejection of information that conflicts with the most fundamental deep core beliefs (Cairney, 2015). As cognitive misers, individuals turn to heuristic shortcuts and therefore think and work within bounded rationality; they also tend to be risk averse and remember losses more vividly than gains. Via the “devil shift”, opponents are considered more sinister and powerful than they actually are (Weible & Sabatier, A Guide to the Advocacy Coalition Framework, 2006). Banded into advocacy coalitions, which is defined as actors who share policy core beliefs and coordinate in to a “nontrivial degree”, resources and framing techniques are directed and implemented to influence policymaking; coalitions seek venues to access points at which such influence can be directed (Weible & Sabatier, A Guide to the Advocacy Coalition Framework, 2006; Weible, Sabatier, & McQueen, Themes and Variations: Taking Stock of the Advocacy Coalition Framework, 2009). *Policy brokers* are mediators who work in an official capacity to resolve intense conflict between coalitions, are generally considered trustworthy by the coalitions, and are typically civil servants such as judges (Weible & Sabatier, A Guide to the Advocacy Coalition Framework, 2006). “Hurting stalemates” occur when “policy participants on both sides of the issue consider the status quo unacceptable and perceive no alternate venues for achieving their objectives” (Weible & Sabatier, A Guide to the Advocacy Coalition Framework, 2006).

Exogenous factors are major shifts in the economic, political, or cultural environment that may affect the actors inside the policy subsystem. These external shocks may shuffle actors across coalitions or shift the balance of resources. However, the shock itself is insufficient to create change; this relies on a coalition's "skillful exploitation" of the shock. The ACF considers the resources at hand to be financial, legal, informational, persuasive, and personnel in nature, and coalitions will attempt to direct these resources in whatever venue opportunity they can access (Weible & Sabatier, *A Guide to the Advocacy Coalition Framework*, 2006). Internal shocks occur when there is a perceived failure within coalitions' abilities to implement successful policy outcomes and coalitions experience a loss in members or power (Weible, Sabatier, & McQueen, *Themes and Variations: Taking Stock of the Advocacy Coalition Framework*, 2009).

Applications

Researchers who apply the ACF define the actors and scope of the policy subsystem empirically usually by interviewing and survey data, either informally or through Likert scales and open comments; media reports or document reviews may also be used to help define the subsystem's dimensions. The historical context of the policy problem is discussed. Highly intense policy issues typically result in clear identification of coalitions (Weible & Sabatier, *A Guide to the Advocacy Coalition Framework*, 2006). Dominant and minority coalitions may be regarded as possessing hard or soft power to better understand hierarchies of resources (Heinmiller, 2013). Methods such as clustering techniques are used to statistically demarcate coalitions (Elgin & Weible, 2013). Some studies are composed of discussion without any statistical analysis, while others may employ a hybrid approach to strengthen the study's utility.

The ACF predicts that learning across coalitions will occur through the level of secondary beliefs. The impact of external events and the stability and coordination of coalitions over time are often

the major focus in applications. Defections among coalitions or counterintuitive alliances have been noted and discussed as well, leading the authors to touch upon the fallacy of assuming that coalitions are necessarily homogenous in their beliefs or goals (Weible, Sabatier, & McQueen, Themes and Variations: Taking Stock of the Advocacy Coalition Framework, 2009). Matti and Sandström are active researchers who have applied the ACF to Swedish subsystems and have challenged the binary for/against coalition sentiments in empirical efforts and emphasize negotiations rather than simply belief coordination as drivers of influence in policymaking (Matti & Sandström, 2013).

Criticisms

Periodically the authors of the ACF address criticisms, most of which question theoretical constructs and potentially important omitted factors. Generally, critiques appear to be published by authors working within the discipline, and some of the major criticisms include:

- 1) The difficulty or limitations in applying the framework to non-American (i.e. non-federalist) subsystems. The framework is also difficult to apply in general.
- 2) There is a tendency of researchers to rely on secondary information (i.e. document review) or implement methods of data collection that were “unclear or unspecified” (Weible, Sabatier, & McQueen, Themes and Variations: Taking Stock of the Advocacy Coalition Framework, 2009).
- 3) There is a lack of explicit theoretical definitions and empirical incorporation of some of the major assumptive tenets of the framework; a review of dozens of applications demonstrated researchers ignoring or not adequately explaining the role of the basic psychological aspects of how coalitions view opponents or not defining the relatively stable parameters or failing to test the framework’s hypotheses (Weible, Sabatier, &

McQueen, Themes and Variations: Taking Stock of the Advocacy Coalition Framework, 2009).

- 4) Shared belief systems do not necessarily guarantee a high degree of coordinated behavior, resulting in free riding, or non-contribution in political efforts (Weible & Sabatier, A Guide to the Advocacy Coalition Framework, 2006).

Adapting the Framework to Non-federalist Systems

While the ACF was usually initially applied to American case studies, researchers have been able to adapt it meaningfully for Westminster or corporatist systems, which generally experience more centralized and therefore less “sticky” policymaking; the relative distribution of government powers in the United States lend to more veto points and more venues for coalitions to access to direct influence. “Coalition opportunity structures” are identified in non-federalist systems where coalitions may leverage their resources and expertise (Advocacy Coalition Framework Overview, 2014).

Caution is recommended for those attempting the ACF on non-federalist countries, and great effort should be made to understand not only the institutional differences, but also the relative importance and autonomy of relevant agencies and the distribution of power between central governments and constituent states or provinces (Cairney, 2015).

Inferences for Shale Gas Development and Policy

An economist may approach the topic of shale gas development as one of feasibility, in terms of cost or market conditions, while an engineer may focus on improving well integrity to avoid contamination issues. If a researcher is concerned about the industry's role in climate change, the entire point of reference may be one based in the scientific specifics of carbon emissions. Further, a political scientist may consider the geopolitical impacts of shale gas, examining the relations between gas and oil producing states or the consequences of not meeting binding emissions reduction goals. Such professionals' assessments often enter the discussion involving shale gas. A fairly extensive review of the literature revealed that the majority of academic contributions have been economic or technical in scope. While these disciplines are great participants in the discourse, it became apparent that a greater picture of shale gas development as a societal issue, down to the individual, is a struggle to conceptualize, particularly with respect to Great Britain. Uncertainties surround the conditions in which development is being pursued, and while the UK-based literature was extremely sparse on the domestic front, those referring to American experiences are often as skeptical as they are enthusiastic. While the government's current stance appears to be one of cautious optimism, largely pointing out the benefits enjoyed from the United States' dramatic growth in shale industry, efforts have begun to adequately gauge and track British societal reaction (Kotsakis, 2012; O'Hara, Humphrey, Jaspal, Nerlich, & Knight, 2013).

This section highlights some of the identified efforts, issues, and discourse occurring with shale gas development in general (or as is occurring in the United States and therefore is relevant in British discussion) and attempts to make inferences from the ACF's ambitions and past applications.

Themes and Approaches in Shale Gas Development Discourse and Research

Though the literature addressing the main policy issues surrounding shale gas extraction is growing, the sheer scope and complexity of the industry coupled with the swift pace of growth in the United States (and to an extent, Canada) has highlighted the dearth in relevant literature and therefore has warranted a call for more comprehensive and clear research agenda. In addition to moving to a better compiling and understanding of the pertinent economic and environmental data, social considerations play a vital role in crafting appropriate decision criteria as the shale industry matures in the United States (Bazilian, et al., 2014) and potentially moves beyond the exploratory phase in the United Kingdom. Despite the relative scarcity of relevant literature, academic themes became apparent and reflected the discourse in media. Social considerations include enhanced understanding of public perception of shale gas development, particularly in the nascent stages in the United Kingdom, the framing methods by various actors, including those who would use economic arguments as a primary justification for shale development. Legal concerns are related to permitting processes and environmental regulation; economic factors include availability of infrastructure, market dynamics, and labor. Engineering or climate change-related aspects are used in both offensive and defensive positions and are generally concerned with water contamination and greenhouse gas mitigation or contribution. Energy security is another facet in a geopolitical context.

Approaches of research and debate originate from a variety of scientific fields, largely from the social sciences and engineering and earth science disciplines, and attempt to tackle identified “problems”, concerns, or contentions using their own established models or language; as discussed by Ostrom in Sabatier’s book comparing policy process frameworks, this can result in disjointed, disassociated research agenda that does not adequately capture underlying or unseen dynamics

inherent in institutional motives and actions and policy processes (Sabatier P. A., *Theories of the Policy Process*, 2007). Shale gas development exists or is potential in a variety of institutional settings (as well as geologically varying environments, which could also create concerns or invalid expectations); it is important for researchers to consider and communicate effectively in identifying issues, implementing research approaches, and disseminating results. Given that actors, including academics, are often working on personal or institutional agendas or with insular methodologies, shale gas development, like any potentially contentious energy source, is regularly mired in fierce debate that is potentially grounded in heuristic assumptions or highly disputed information (such as emissions data) that is difficult to model empirically or to persuasively disseminate and therefore are more subject to diminishment or dismissal.

The heterogeneous nature of experiences raises the question as to which approach (or approaches) is appropriate when examining shale gas development in and across relevant regions. While the intricacies of an issue as complex as shale gas development (beyond project economics or the broader markets such an industry operates within) arguably cannot be reasonably captured or thoroughly analyzed in any particular framework or formal theoretical models, attempts to best articulate and develop process theories are nonetheless imperative if we are to fairly and adequately cover the most serious and pertinent points of analysis.

It is here that we can further consider some of the conceptual merits of the ACF as they relate to shale gas issues in the US and the UK.

Defining a Subsystem

The definition and demarcation of a subsystem are approached differently by researchers who study and apply the ACF but are recommended to be defined empirically by interviewing relevant

actors of the subsystem (Weible & Sabatier, *A Guide to the Advocacy Coalition Framework*, 2006). One should consider when defining a subsystem the “legal autonomy of each level” and “actor integration across levels” (Sabatier & Jenkins-Smith, *The Advocacy Coalition Framework: An Assessment*, 1999). Subsystems can interrelate, whether overlapping- in which cases there may be expertise in more than a single subsystem- or with subsystems existing as a subset of another. The relative intensities of participation can vary between the interrelated subsystems.

Going with the assertion (Centner & O'Connell, 2014; Davis, 2012) that hydraulic fracturing (fracking) regulation in the United States exists nearly completely at the state level, with minimum intervention or key exemptions from federal regulation, one may define a subsystem for fracking policy at a state or even municipal level. The municipal subsystem may be nested within the state system, with overlapping actors, particularly state legislators, environmental groups, and gas companies. In the United Kingdom, as the geographical knowledge of shale plays are improved, one would consider the relative powers of each affected member nation (England, Scotland, Northern Ireland, and Wales) have concerning permitting access to fracking sites when defining the subsystem; the entire United Kingdom may then exist as a subsystem of the European Union, as the United Kingdom is bound by carbon emissions objectives and may experience pressures by other EU bodies to limit fracking. The majoritarian institutional structure of the United Kingdom would require particular needs for adapting the ACF to adequately account for the lack of official veto points; authors could look at possible efforts by the government to create venues for public inputs or the abilities of local permitting bodies to undermine centralized government's attempts to streamline application processes.

Public Perception of Shale Gas

Public opinion has the potential to influence regulatory bodies to respond to extraction industries; it now has an enhanced role in the ACF. Despite its importance, the shale gas public perception literature is fairly sparse, especially as it pertains to the United Kingdom. By and large studies are confined to the United States (Boudet, et al., 2014; Wynveen, 2011; Kriesky, Goldstein, Zell, & Beach, 2013; Schafft, Borlu, & Glenna, 2013; Theodori, Introduction: Special issue on social issues associated with unconventional natural gas development, 2011; Theodori, Perception of the natural gas industry and engagement in individual civic actions, 2013) and mainly related to the Marcellus Shale and Barnett Shale in Pennsylvania and Texas, respectively. In the United Kingdom, The University of Nottingham has conducted a series of nationally representative public opinion surveys since 2012 to monitor awareness, associations, and approval of shale gas extraction and has tracked increasing awareness and shifting associations with environmental concerns and economic benefits (i.e. identifying earthquake or water contamination with fracking or cheap energy) and a decreasing but marginally favorable opinion concerning the inclusion of shale gas in the domestic energy mix (O'Hara, Humphrey, Jaspal, Nerlich, & Knight, 2013).

As with the United Kingdom, opinion polls in the United States show that Americans generally support shale gas extraction. Also paralleled is a substantial portion of both populations at the national level still with little to no familiarity with shale gas extraction (Boudet, et al., 2014), despite widespread media coverage of both the economic benefits and environmental risks in the United States and government support and activist protests in the United Kingdom.

A nationally representative survey in the United States by Boudet et al (2014) examined the socio-demographic predictors of support in the United States and asked respondents to relay their “top of mind” associations with hydraulic fracturing. They found that of those who were even aware

of the process (and 39% were not aware at all), the majority (58%) could not describe the process in any relevant or unambiguous terms. Few mentioned economic, environmental, or social impacts. The authors found that age, conservative ideology, and formal education positively predicted support (their hypothesis that formal education was negatively associated to fracking support was not supported), while female gender and egalitarian worldviews were negatively associated with support. Their hypothesis that an individualist worldview, which is strongly associated with American cultural attitudes, was not predictive of support.

Science Communication and Policy

The discourse over shale gas is assessed from many angles, including climate change mitigation, energy security, natural gas prices, political and economic (trade) relationships, and economic growth. Researchers interested in how shale gas extraction is debated or perceived must look to how the messages concerning information about economic, environmental, or other technical shale extraction information is structured.

A classic model for science communication is the deficit model, which posits that as publics become better informed of a scientific topic their perceptions and beliefs move closer to the scientific consensus. However, some researchers (Hart & Nisbet, 2012) suggest that perception and support for some issues are closely tied to social identity, which may include political affiliation, and that the deficit model is not an adequate tool to better communicate some topics such as climate change or emerging technologies. The topic of shale gas extraction may be another that does not fit the deficit model assumptions of science communication; as Boudet et al. (2014) discussed in their fracking survey, conservative ideology is a strong predictor of fossil fuel development generally and was positively related to fracking support in the model. Should further scientific studies support claims of environmental damage resulting from shale gas development,

it may be unlikely that these typically core identities and beliefs could be changed easily even with increased access to scientific information; with evidence to the contrary, resistance to change may occur among individuals with anti-fracking sentiments associated with deep core beliefs. This would seemingly support the ACF hypothesis that fundamental values are highly resistant to change and that technical information is filtered and potentially rejected when it conflicts with those beliefs. However, the effect of technical information on policy core or secondary beliefs with respect to shale gas should be a focus in future work, as experts work to consensus in certain scientific aspects of shale gas impacts and awareness of fracking continues.

Unfortunately, even a cursory review of the literature showcases ongoing debates in scientific circles concerning some of the environmental impacts of shale gas extraction, so what counts as “consensus” may be currently inapplicable in some respects. This includes the notion of shale gas support as a fuel “bridge” to a lower carbon energy mix (Schrag, 2012), reservations about the efficacy of regulation (Centner & O'Connell, 2014) in the United States and globally, with trade secret protection posing a threat to trust of industry (Leggette, et al., 2013). Economic studies of the impacts of shale gas are sometimes called into question (Kinnaman, 2011) as academia is increasingly affiliated with and funded by industry. While this project cannot meaningfully evaluate some of the engineering or climate change literature’s methodologies, the economic impacts can be discussed briefly, as the project believes that it is here where some of the most powerful arguments for shale gas development will be expressed.

Economic Benefits of Shale Gas, Local and National

Economic benefits accompanying the extraction of shale gas are often touted to motivate the acceptance of the industry; such benefits may include tax receipts, jobs, and an improved balance of payments as the import bill shrinks thanks to domestic production and lower import prices.

Though studies may present varying levels of economic impacts, they typically do report positive effects or promising future effects (Considine, Watson, & Blumsack, 2010; Weber, 2012); industry and government therefore have a potentially convincing and popular argument to justify the development of shale resources in the presence of sufficient regulation.

Much like perceived or actual technical or environmental deficiencies concerning shale gas activities enter the debate, economic benefits are subject to scrutiny, particularly if weighed against the costs of negative environmental externalities. However, these externalities are arguably far more difficult to measure than tax receipts or job figures. Proponents of shale gas development, such as energy companies or coalitions, could use the more digestible and tractable economic figures to better bolster their arguments for development or continued activities.

These many points of discussion suggest that the ambiguity and uncertainties in shale gas development make for great difficulty in reaching a point of scientific or political consensus, even among relevant coalitions that may be identified in future research. However, the very nature of shale gas development and extraction is subject to argumentative manipulations or vague conceptual associations, even if people do not actually understand the scientific material they are presented with. While the ACF does hold central the role of technical information in the analysis concerning policy related learning, the concept of “skillful exploitation” of events here may be the more germane one; competing viewpoints and conclusions on the merits of shale gas, all with their own models and evidences, must be either convincing enough to policy decision makers or to dominate coalitions to push or stop shale activity. In either case it may not be truly relevant whether publics believe shale gas development is “good” or “bad” for the economy or the environment; those who have the power to drive the policy process may also be completely off the mark in terms of the economic or environmental facts. Also, even if actors intend rational

outcomes, their inability to foresee the realities of markets and intelligently weigh all scientific considerations could result in or contend with “wrong” consequences, such as stranded assets, worsening of climate change, souring of political relations, or environmental contamination.

The Cases of Energy and Climate Change Policy in Colorado

Applications of the ACF vary across institutional structures and policy contexts, and the project sought literature from which to attempt direct insight for shale gas development. A handful of case studies concerning the state of Colorado are potentially enlightening. Colorado is particularly interesting because of its geographical vulnerabilities to climate change effects, the presence of a voter approved or state legislated renewable energy initiatives and carbon reduction goals, and the extent of fossil fuels industry.

Elgin and Weible (2013) identified pro and anti-climate change coalitions merging ACF and the Policy Analytical Capacity (PAC) approaches; PAC measures the capacity of individuals in terms of formal training (i.e. statistical modelling or expertise in analyzing policy in this case) using questionnaire data; the results found that the major coalitions possessed members of broadly similar levels of formal training and experience in their fields and length of engagement in influencing policy. The higher the capacity an individual or coalition possesses, the PAC asserts, the more policy is likely to be affected by their efforts. The study was descriptive in nature but does better inform the literature on the coalition structure of involved actors in Colorado policymaking.

Another study by Laird (2008) discussed the atypical case of a successful intervention of an environmental group on regulatory energy policy. A typically collegial relationship between the Colorado Public Utilities Commission (PUC) and the state’s foremost electric utility turned

adversarial in 2001 when the PUC ordered the utility to construct a wind power plant; the utility vehemently opposed the plan and made great efforts to demonstrate the plant's economic unfeasibility. Laird referred to the informational and social relationships shared by regulatory bodies and utilities, in which both parties consult professionals for their technical information to make decisions based on economic, engineering, environmental, and social impacts of their actions. In this regard, utilities often possess far greater information and power than coalitions with environmental protection designs and certainly more than the general public. The asymmetry of power, information, and incentive, along with an often dependent relationship on the part of regulatory bodies on utilities in terms of expertise, often results in utilities enjoying more beneficial policy results. Deregulation of utilities from legal monopolies to retail entities have not meaningfully shifted the fundamentals of the relationship between regulators and utilities, he asserts, which is based on regulators facing realities of fossil fuel reliance, dependence on utilities for information, limited political involvement, and decisions made on pricing calculations and exchange of arguments based on exchanges technical in nature. In the case of Colorado, the structure exists still in the conventional legal monopoly/state regulators dynamic. The PUC considers market realities of any manner of electric generation, whether created using fossil fuels or renewable sources, such as wind. A large cost differential would make the calculation simple for decision making, but as (usually subsidized) experience in renewable energy increases, generation costs tend to decrease. The closer the renewable costs to conventional costs, the more difficult it becomes to argue against the implementation of renewable energy generation.

In Colorado, the regulatory body's governance is relatively autonomous and stable, the decision making process long steered by notions of economic and technical efficiencies. However, the PUC began to exhibit a consideration of environmental externalities from utilities' actions in cost

calculations, suggesting institutional learning effects. The PUC also encouraged public involvement and mandated the utility to consider the needs of customers as a formal component of their planning; even though the utility still held asymmetrical levels of power and influence in this situation, it did create opportunities for potential intervention by environmental groups far less equipped with expertise and people.

A salient point of the case is that the decision by the PUC to mandate a wind power plant was not due solely by environmental protection advocacy or renewable portfolio requirements. The rationale was economic, in direct opposition to the utility's economic arguments. The success of the environmental group also demonstrated that efforts by dominant coalitions could be subverted in the face of institutional learning and if there exists actors in an official capacity who would and could make policy decisions based on learning effects. Laird considered this case revolutionary in its potential effects on neighboring states and for utility regulation policy in general (Laird, 2008).

These studies suggest that Colorado would be an academically interesting subsystem in which to conduct ACF analysis and attempt to compare to the United Kingdom. In addition, the state, much like the United Kingdom, possesses renewable energy and carbon reduction initiatives and a generally favorable (politically speaking) business environment.

Connecting the Pieces

Congregating the known and uncertain elements in the US and UK can enhance the conceptualization of the many aspects of shale gas development. While the ACF has limited predictive power, the efforts by its researchers do inform the body of knowledge concerning mechanics of policy processes. Shale gas development may not have direct parallels with its

current body of applications, but knowing where certain actors may concentrate their efforts and policymaking trends in similar situations (as well as anomalous cases) at the very least produce a clearer picture of a very complex issue that spans many scientific disciplines and swaths of society. Integrating points of analysis could highlight where further outreach and communication between experts and publics could be improved.

Shale gas development in the UK is largely conjecture at this point in terms of economic or technical feasibility, though attempts to understand and predict the industry's growth and effects are ongoing. Because the UK will look to US experiences to gauge their own abilities and tolerances to accommodate a potentially contentious industry, increased social research and literature is clearly warranted. Of course, policymakers and industrial actors will not necessarily wait for further social science publications and will themselves attempt to formulate appropriate actions.

Concluding Remarks

This project began with a drive to better understand how or why shale gas development may or may not occur and as the review of the literature progressed, an increasing dissatisfaction with conceptual goals turned the focus away from primarily economic considerations. The ability to sufficiently conceptualize the complexity and interactive dimensions of an issue such as shale gas development is somewhat limited when expertise is directed at single points of analysis without an adequate synthesis of those seemingly disparate points; not least of all, the human aspects can easily get lost in the shuffle.

Despite the potential insights gleaned from an emerging paradigmatic approach from an adjacent social discipline, a student of economics may initially scoff at the relatively indefinite theoretical constructs and seemingly ad hoc methodologies apparent in applications of the ACF. Admittedly, much literature in policymaking processes laments and criticizes the lack of formal rigor as exists generally in the discipline. To be sure, the framework's authors and those who have applied it have endeavored over time to better enhance its usefulness, applicability, and power; its ambitious goals and relative empirical robustness have ensured (or allowed) its survival thus far. Whether the framework finds credibility among other social scientists, such as economists, depends on those scientists' openness and expectations in taking on interdisciplinary approaches to problems typically undertaken with notions relatively bounded in disciplinary segregation.

The project's work produced some insights about the social sciences in general. The approach a researcher may take is likely dependent on inherent philosophies and consensus rooted in a discipline in which one works. This project's goals could have been to attempt an analysis of economic impacts of policy or industry and inform prescriptive efforts to improve efficiencies,

which is presumed to help society. The project concludes that it serves as one of many foundational stones attempting to bridge disciplinary gulfs and work towards clarity in a topic easily muddled in debate and highly susceptible to manipulative arguments.

In any event, knowledge for its own sake is never a lost cause, and drawing insights from (or directing constructive criticisms toward) other scientific tactics in the very least creates lively discourse. In the quite lively topic of shale gas development, the project makes some conclusions as regards the ACF.

The ambitions of the framework itself are admirable and appear flexible in terms of their applicability. However, much of the theoretical underpinnings have yet to be formalized in a manner that might be acceptable to encourage further cross-discipline work; reviewing the literature suggests this is the case, as the framework's drawing of concepts from other disciplinary concepts is largely unilateral. Whether this is on account of hubris among more visible or more formalized social science fields or because it is legitimately due to the limitations of a young and somewhat nebulous and loose framework, as it stands the ACF is more or less a rising star in its own sub discipline of policy making.

The project does contemplate the possible integration of formal economic theory into the ACF; also unclear is if and to what extent economic "information" is subsumed under the definition of "technical information" that the ACF considers crucial in the role of coalition learning. To be sure, economists are routinely sought after for their input into policy formulation and their analyses are frequently and often widely disseminated and interpreted in academic, industrial, and other contexts and purposes. Economists' efforts are also often interventionist in nature, formulated to produce action toward more "efficient" or desirable outcome for society, though the exact beneficiaries of such efforts may be debated for "fairness" for marginalized populations or for its

considerations for the environment. Much of the economic literature concerning shale gas was concerned with gains in income or other market effects. Conversely, publications with an environmental bent were sometimes lacking in economic deliberation. It is ultimately incumbent upon policymakers to weigh the environmental/economic nexus appropriately.

Questions about free riding also are raised. As a persistent issue particularly in environmental planning, the tendency of public participation to suffer due to passive individuals riding on the efforts of others is a problem those who advocate increased participation to boost the legitimacy of policy (Rydin & Pennington, 2000). At a state or national level, even if fracking is perceived as an environmental (or economic) net negative for society, collective action issues may occur. Negative media coverage may contribute to individuals' association with fracking and negative environmental externalities, but associations may not be sufficient enough to stimulate meaningful participatory activities among the general public. The notion of rational ignorance from public choice theory suggests that individuals may also choose not to seek out additional information should the costs (in terms of time, energy, and effort) be deemed higher than the impact on policymaking that the individual may believe him/herself to affect (Rydin & Pennington, 2000). The ACF appears to consider free riding as regards political behavior, i.e. some of those who share beliefs with coalitions will neglect to participate in directing policy.

Finally, clarity on adapting the framework to Westminster systems would be useful; this project found very limited information regarding how to do so and exactly what to consider. The very goal of the project was somewhat stymied by the lack of guidelines in this matter and did not produce a satisfactory analysis for theoretical considerations for future US and UK ACF comparative applications.

In the end, a complete synthesis of any particular topic with multiple points of scientific analysis, even with neutral dissemination of information, no matter how accurate, is not likely to result in desired efficient or fair outcomes. This may be the most valuable takeaway from the project's examination of the ACF: possibly no analysis is immune from the influence of belief systems, as long as human beings cannot or will not process all relevant information, they disagree on the basics of how society should be structured, there exists possibilities for free riding or rent-seeking behavior, profound tradeoffs between environmental protection and economic development remain, and those who endeavor to understand or create new knowledge, no matter the motive or results, do not or cannot coordinate and collaborate and may not necessarily encourage optimal outcomes no matter how they are defined.

Recommendations for Further Study

An obvious recommendation for further research is empirical analysis of American subsystems to explain policy change as it relates to shale gas. Of particular interest may be the opening of public land for drilling, extraction activities in highly populated residential areas, or states that share plays or have disputes concerning water or waste management.

A particularly interesting future study would concern the release of the Environmental Protection Agency's report of the potential impacts on groundwater from hydraulic fracturing. The report, with an expected release in 2014, will undoubtedly be challenged no matter whether the results are favorable to industry or anti-fracking bodies. Much like the notion or validity of economic benefits, the perception or validity of environmental concerns may or may not have meaningful bearing on policymaking. Enhanced theoretical development of public policy processes concerning the success or failure of framing techniques, particularly in the energy-economic nexus of varying subsystems would help to better inform cross-discipline work in energy policy. Further, improved applications across differently structured subsystems will better enhance understanding of diffusion of technology or other goals, such as the replication of economic benefits and avoidance of environmental issues.

This project attempts to inform on its own merits; however, it does inform future doctoral research by the author, in a project that will examine drivers of public opinion and policy as regards shale gas development in specified regions of the United States and the United Kingdom.

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