Education & Outreach Programs:

Important Factors in Sequestration's Future

A Presentation for the Second Annual Conference on Carbon Sequestration

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ABSTRACT

To facilitate acceptance of carbon sequestration by the general public, industry decision makers, and government policy makers, it is necessary to develop well-structured education and outreach programs. To provide a support base for carbon sequestration field tests, pilot projects, and integrated demonstrations in the United States, meaningful education and outreach programs, grounded in managed communications strategies, must be implemented in each target area. These education and outreach programs provide the foundation for research activity successes and will serve to stimulate interest in future commercial development. This presentation examines the elements of a comprehensive carbon sequestration education and outreach program, as well as the present sequestration-related issues of concern to stakeholders that indicate the value of these programs.

INTRODUCTION

Today, three key forces are driving the development of emerging energy technologies – market forces, environmental concerns, and technological innovation. These forces are not mutually exclusive, and, in most cases are inextricably linked. The result of the collective efforts of these forces is the rapid development of paradigm-changing technologies.

Paradigm-changing technologies could range from cleaner coal combustion technologies to efficient solar arrays, and from fuel cells to carbon sequestration applications. Regardless of their manifestation, these technologies will alter the manner in which energy is produced, utilized, and viewed by stakeholders.

Clearly, when innovation occurs, and paradigm-changing technologies emerge and are deployed, opposition can arise. Among the most famous, or infamous, of the historical anti-innovation movements was the Luddite movement in nineteenth century England. The Luddites, named after Ned Ludd, organized against technological advances in the English textile industry, and in many cases rioted against their perceived enemy – technological innovation.

For carbon sequestration to succeed, significant efforts must be made to educate and engage stakeholders and prevent the creation of sequestration Luddites. This paper traces recent sequestration-related issues of stakeholder concern, documents the valuable role that education and outreach programs will play in the future of sequestration deployment, and provides conclusions as to the process to ensure that sequestration does not meet with significant opposition when sequestration technologies are ready for wide-scale deployment.

RECENT RELEVANT ISSUES OF STAKEHOLDER CONCERN

Carbon sequestration is a technology field with a broad reach in terms of application. For instance, carbon sequestration is a term that embraces terrestrial sequestration, geologic sequestration, ocean sequestration, and other advanced concepts. Each of these types of sequestration, in turn, includes a legion of potential applications, as well. For instance, geologic sequestration, could involve sequestration in deep saline aquifers, deep unmineable coal seams, and hydrocarbon storage fields, as well as through enhanced conventional oil and gas production, enhanced unconventional oil and gas production, and enhanced coal bed methane production.

When considering these countless applications and the technologies that accompany each application, technological innovation comes not in one step, but in many cases, multiple applications. This double-edged sword means that carbon sequestration is rich with options for success. However, the other side of the blade bears the curse of this menu of options – a range of opportunities for negative impacts to be levied against carbon sequestration when fear of innovation outpaces stakeholder educational and outreach programs supported by scientific findings and analysis.

The following sections of this paper illustrate some early instances where a lack of effective stakeholder education and outreach programs have resulted in substantial controversy regarding sequestration-related applications, including ocean sequestration and coalbed methane development. It is important to note that these controversies are not borne of technology failures, but, instead, from absent or ineffective stakeholder education and outreach programs.

Ocean Sequestration Issues

The difficulties encountered by ocean sequestration studies have been well documented in the past several years. In fact, during the time preceding planned ocean sequestration studies off the coasts of Hawaii and Norway, education and outreach programs were not implemented in an effective manner prior to the active voicing of concerns about each respective research endeavor. Ironically, this inability to move forward from the planning phase has resulted despite an international project agreement signed in December 1997 at Kyoto, under which the concept was endorsed.

There have been a number of studies of the public outreach shortfalls of the Kauai, Hawaii project, which was to have been the initial location for the international analysis of direct injection of carbon dioxide into the deep ocean. Among the most well-known of these analyses is the study led by Dr. Howard Herzog and a number of collaborators from the Massachusetts Institute of Technology.[1] Their assessment aptly details how a brief article in a local Hawaiian newspaper initiated a barrage of attacks on the planned research initiative prior to the start of an organized stakeholder education and outreach program.[2] Sadly for the cause of experimental science, even a crisis management-oriented education and outreach program failed to adequately address the issues of concern. As the Herzog analysis is very thorough in its research and analysis, it would be duplicative to restate the lessons learned under this activity. To summarize the results of the analyses of this endeavor, though, it seems that in the absence of organized, effective communications strategies, controversy and fear can, indeed, provide an obstacle to scientific research.

Similarly, several months ago, attempts to relocate the research project to off the coast of Norway failed to take root in the face of intense public scrutiny.[3] Of course, this project was initiated on the heels of the failure to secure the opportunity for the Hawaiian research exercise, and, again, witnessed opposition preceding the launch of a managed communications strategy.[4]

In both the Hawaii and Norway ocean sequestration project efforts, four generally expressed stakeholder concerns appeared at the center of the debate. First, it was stated that those who opposed the project feared potential for ocean pollution resulting from the activity. In addition, the detractors voiced concern for possible effects on marine life. Also, these individuals and groups expressed fear of potential for international treaty conflicts to arise should the project move forward. Finally, it also seemed that these concerned stakeholders simply did not want the project to occur so close to their homes.

Given these general concerns, it can be surmised that the principal reasons for the failure of the ocean sequestration activity to find a test site are the lack of adequate addressing of stakeholder concerns and the absence of an early implementation of education and outreach programs for the projects. Indeed, it seems that these failures could have been avoided.

Coalbed Methane Development Issues

In recent memory, the only other sequestration-related energy and environmental application to enjoy the same level of dubious notoriety as the ocean sequestration is that of coalbed methane development. Coalbed methane development, of course, is well underway in many parts of the world, including the United States. While enhanced coalbed methane production techniques may afford an option for carbon sequestration, the present controversy has arisen not as a result of carbon sequestration, but as a failure for effective, managed education and outreach programs to be provided to stakeholders in this development process. Instances of these crises have erupted in both the San Juan Basin, which serves as the top-producing coalbed methane basin in the United States, as well as the Powder River Basin, among others.

As an example of this position, a Los Angeles Times Magazine article from February 2003 paints a grim picture of the viewpoints among certain stakeholders regarding coalbed methane development in the Powder River Basin.[5] For example, the writer describes one instance of this conflict in vivid detail:

> *The conflict over coalbed methane is at a constant simmer, and occasionally boils over, as when two of the players nearly came to blows. On a bus tour of the methane fields, with the governors of Montana and Wyoming along, it was (one of the player's) turn to speak and he began describing in emotional detail what methane development had done to his land. (Another man) shouted that (the other) was a liar and threatened to hurt him. The shouting went on until Judy Martz, the governor of Montana, calmed them down.*[6]

While many in the San Juan Basin and the Powder River Basin who presently oppose coalbed methane development state that this opposition is derived not from disdain for coalbed methane activity, but from a desire that the development be performed in a manner that ensures a minimal footprint, the volume of local media coverage and the notoriety that the issue is now receiving in mainstream national media publications, like that of the Los Angeles Times Magazine, may evidence a stakeholder crisis for coalbed methane industry. Perhaps this scenario could have been avoided with sufficient education and outreach during the initial activities in these areas.

To summarize, similar to the generally expressed concerns involving ocean sequestration, concerns regarding coalbed methane development included issues of possible effects on terrestrial systems, potential for impacts on water quality, and individuals and groups focused on the fact that the development was being slated for areas proximate to their ranches and homes.

Whether concerns about the potential for hydraulic fracturing activities to impact underground sources of drinking water prove valid, the stage has been set for coalbed methane development to become a lightning rod issue. This scenario, if not properly addressed through education and outreach, could impact opportunities for carbon sequestration application involving enhanced coalbed methane production.

Encouraging Words

All mainstream media portrayals of carbon sequestration related issues are not so grim, however. Witness a recent *U.S. News & World Report* piece, entitled "A Deep Six Fix," which focuses on the potential promise for geologic carbon sequestration to aid in greenhouse gas emissions management.[7] The article provides positive words regarding the activities of the AEP-Battelle project at New Haven, West Virginia, and the Weyburn project at Beulah, North Dakota. Citing technology and cost hurdles, however, the article concludes: "(i)t's too soon to say whether carbon sequestration is the answer to the greenhouse gas problem, a stopgap, or a dead end."[8]

So, while positive portrayals of carbon sequestration science can appear in major media publications, the examples of the troubles confronting ocean sequestration and coalbed methane development testify to the difficulties that may confront deployment of sequestration-related technologies and applications, if effective education and outreach programs are not initiated in advance of the sequestration activities.

SEQUESTRATION'S FUTURE: EDUCATION AND OUTREACH PROGRAMS

The preceding section of this paper demonstrated how two ongoing technology deployment activities related to carbon sequestration – ocean sequestration and coalbed methane development – have both been confronted with public concerns. In each instance of concern, early stage stakeholder education and outreach programs were not initiated by the participating parties. Thus, it appears that stakeholder education and outreach programs could be a key to sequestration's future, as they provide a baseline for stakeholder acceptance of technological innovation.

Given this conclusion, the key issue before advocates and developers of carbon sequestration technologies and approaches becomes one of structuring these programs. Sequentially, successful education and outreach programs will include stakeholder research activities, strategy development, program deployment, and, then, technology deployment. Next, this paper will examine these areas of activities in greater depth.

In order for carbon sequestration technologies and approaches to be demonstrated and deployed, significant time and effort is devoted to the research phase of technology and approach development. The stakeholder education and outreach component of carbon sequestration technology demonstration and deployment should involve significant research as well. For best results in sequestration technology deployment activities, the stakeholder education and outreach activities must be grounded in well-structured research, including survey research endeavors, focus group facilitation, and statistical analysis of the responses from the research efforts. These efforts will allow for discovery of the elements of public perception and could form the core of the stakeholder education and outreach strategy.

Once the initial research phase has been completed, the next two phases focus on the development of a managed communications strategy – strategy development and program deployment. This managed communications strategy will serve as an elemental education and outreach plan, grounded in the findings and themes of the stakeholder research activities. In structuring the managed communications strategy, it would be vital to establish a realistic timeline for execution of the program plan, including the design of a mechanism to ensure that education and outreach occur before misinformation could create potentially unfounded concerns among stakeholders.

In the strategy development process, it is important to consider two steps that will be reached once this initial strategy for the managed communications strategy has been forged and initially deployed – continuous dialogue with stakeholders and the continuous refinement of the education and outreach program. Clearly, stakeholder perceptions can change as the education and outreach program is activated, thus, the program must include an opportunity for feedback from stakeholders, including, possibly, additional survey research endeavors and focus group facilitation. As this feedback is obtained, the education and outreach program must be refined and honed to improve its effectiveness.

Thus, stakeholder education and outreach programs cannot be considered as one-time actions, but, instead, must be conducted throughout the development and deployment phases of the carbon sequestration technology maturation process. So, as stakeholder education and outreach programs will be necessary to ensure that carbon sequestration has an opportunity to reach wide-scale deployment, this area of emphasis will be vital to sequestration's future.

CONCLUSIONS

Well-structured and well-executed education and outreach programs will produce stakeholder engagement with and acceptance of carbon sequestration technology and application development and deployment. These program areas will drive successes for the science of sequestration and its principal benefactor, the United States Department of Energy. The initiatives which must rely on stakeholder education and outreach programs include the Regional Carbon Sequestration Partnerships (RCSPs), FutureGen, as well as existing discrete research and development projects. Just as significantly, wide-scale deployment of sequestration technologies and approaches rely on the performance of these education and outreach programs as the incremental steps necessary to ensure wide-scale deployment, such as the RCSPs and FutureGen, will be fueled by these education and outreach programs.

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