



Bipartisan Policy Center

# Case Study

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**THE FEDERAL ROLE  
IN STAKEHOLDER  
ENGAGEMENT FOR  
A CARBON CAPTURE  
AND STORAGE  
DEMONSTRATION  
PROJECT**

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# Introduction

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The bipartisan Infrastructure Investment and Jobs Act (IIJA) marks a significant uptick in federal investment in clean energy demonstration and deployment projects. It provides the Department of Energy more than \$20 billion to deliver much-needed demonstration projects and accelerate clean energy adoption. DOE has committed to deploy these technologies in a manner that advances energy and environmental justice—underscoring the need to engage communities in decisions about major energy projects. To help inform successful stakeholder engagement activities from DOE going forward, the Bipartisan Policy Center is exploring past projects for insights and lessons.

Accordingly, this case study provides an overview and summary evaluation of experience with stakeholder engagement processes in Illinois, widely considered to be a success, for the carbon storage component of the FutureGen carbon capture and storage (CCS) demonstration project. It covers engagement processes that occurred in Illinois between 2003 and 2010. The study provides insights into (1) the federal government’s role in stakeholder engagement for energy demonstration projects and (2) key considerations for assessing and ensuring successful stakeholder engagement. Part I outlines the timeline and history of the FutureGen project proposal, selection, and termination processes. Part II describes the effect of federal decisions and processes on stakeholder engagement for the carbon storage component in this Illinois project. Part III provides a detailed look at factors that contributed to the project’s successful stakeholder engagement. Lastly, Part IV summarizes key findings and lessons learned to inform future federal processes for project selection, management, and stakeholder engagement for federally sponsored energy projects.

*Note: This study is focused on understanding early stakeholder engagement at a specific location and time, with specific stakeholders. In the context of this case study, success is measured by the accomplishment of a robust and meaningful stakeholder engagement process and is not tied to project completion.*

# Part I: Project Narrative

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FutureGen was initiated by the Department of Energy in 2006 as a competitive opportunity to demonstrate CCS technology on a commercial-scale electricity generating plant. However, the origins of the FutureGen competition date back to 2003, when regional actors were coming together in various parts of the country in anticipation of federal action on funding a CCS demonstration project. For example, DOE initiated the Regional Carbon Sequestration Partnerships (RCSPs) program under which seven partnerships were created, including the Midwest Geological Sequestration Consortium (MGSC), to conduct regional characterization and demonstration projects with the aim of gaining insights into the potential for safe and viable carbon storage throughout the United States.<sup>1</sup> The Illinois State Geological Survey (ISGS) at the University of Illinois was the principal investigator for the MGSC and directed all efforts including stakeholder engagement, geologic characterization, site selection, monitoring and verification, drilling, permitting, and all other essential activities associated with demonstrating carbon storage as a viable carbon management technology.

## KEY FINDING

Stakeholder engagement activities centered on education and gaining trust around geologic carbon storage were initiated three years prior to launching the FutureGen competition. Trusted experts at the state level conducted integrated and objective stakeholder engagement representing multiple voices, disciplines, and perspectives in the state and in relevant communities.

DOE structured the FutureGen competition as an open competitive funding opportunity process between communities and partnered with the FutureGen Industrial Alliance (the Alliance), a non-profit company comprised of the largest international coal companies and electric utilities, for the site selection.<sup>2</sup> The seven founding Alliance members included: American Electric Power, BHP Billiton, CONSOL Energy Inc. Foundation Coal Corporation, Kennecott Energy (Rio Tinto Group), Peabody Energy, and Southern Company.<sup>1</sup> The initial

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<sup>1</sup> See Appendix A1 for a List of Acronyms.

<sup>2</sup> Folger, P. (2014). *The FutureGen Carbon Capture and Sequestration Project: A Brief History and Issues for Congress*. Congressional Research Service.

project was envisioned to be a new 275-megawatt (MW) coal-fired power plant using integrated gasification combined cycle (IGCC) technology with pipeline transport and geologic storage of captured carbon dioxide (CO<sub>2</sub>).<sup>1</sup> Multiple proposals from different states were submitted for review to the Alliance, which ultimately narrowed the semi-final project sites to four: two communities in Illinois (Mattoon and Tuscola) and two in Texas (Jewett and Odessa).

The State of Illinois was organized and deliberate about attracting the Alliance to conduct the project in either Mattoon or Tuscola. These communities were proposed by local economic development specialists working to attract the project and be situated as a world-leader in clean energy. The economic development offices located in the counties of Coles (Mattoon) and Douglas (Tuscola) were critical to local engagement efforts conducted in conjunction with many state-level organizations such as the Illinois Department of Commerce and Economic Opportunity (DCEO), Illinois State Geological Survey, the Governor's Office, and academic institutions throughout the state. From the beginning of the semi-finalist project reviews, both Mattoon and Tuscola communities supported each other—a win for one community was considered a win for Illinois.

#### **KEY FINDING**

The alignment of federally funded project objectives, state interest, local benefits, and local subject matter experts was a significant factor in stakeholder engagement success in the Illinois FutureGen project.

The concurrent nature of these local efforts in Illinois were critical to the success of the stakeholder engagement process. Strong collaboration between the two distinct DOE programs, the MGSC regional partnership and the FutureGen competition through the Major Demonstrations program, also increased the chances of stakeholder engagement success. Due largely to the on-going geologic characterization conducted by the ISGS through the RCSP program, the State of Illinois was well-poised to select carbon storage sites for the FutureGen competition based on sound geologic principles and criteria as defined by the Alliance. More information on the RCSPs and MGSC-informed stakeholder approach is provided in Appendix A2.

The MGSC was already leading innovative stakeholder engagement activities around the state and nation. The participation of a skilled, embedded set of experts at the state level allowed Illinois to create an integrated, objective, stakeholder engagement team that incorporated multiple voices, disciplines, and perspectives. Additionally, the alignment of activities between FutureGen

and the MGSC was critical for stakeholder engagement success. State-wide media coverage and the popularity of the FutureGen concept throughout Illinois helped to familiarize stakeholders with the concepts of carbon capture and storage and further explain other projects in the region. This made it possible for the MGSC and the Alliance to build considerable capacity with stakeholders at all levels of Illinois society, from lawmakers to farmers to teachers and industry leaders, and especially among decision-makers.

Thanks to early stakeholder engagement and increased public familiarity, attracting the FutureGen project was seen by relevant stakeholders as a benefit to the communities of Mattoon and Tuscola, as well as throughout Illinois. This level of understanding was somewhat unprecedented in that it reached beyond local project sites and held for several years. Thus, the high-level, broad-based stakeholder engagement initially conducted around CCS demonstration projects was primarily positive. This engagement was conducted by a combination of the Alliance, the State of Illinois (primarily the DCEO), local economic developers, and the ISGS/MGSC. These organizations worked together to develop key messaging, host shared events, and support overall stakeholder engagement throughout the early FutureGen process. There were also many opportunities for each organization to conduct direct and specific stakeholder engagement based on their role as project developer, state agency, local representatives, or subject matter experts, respectively.

#### **KEY FINDING**

Selection criteria for the initial FutureGen carbon storage project carbon storage site selection were varied and included aspects of stakeholder interest, not just technical feasibility. Factors considered in project site selection included: geology, proximity of CO<sub>2</sub> source, local and regional government interest, benefit/cost analysis, risk profile and perceptions, public opinion, government alignment, industrial partners, infrastructure, policy, and more.

In December 2007, the Alliance selected Mattoon as the winning location to host the FutureGen power plant and carbon storage project. The community and State of Illinois were thrilled to be the host of this innovative project. However, the project quickly stalled due to a variety of issues including escalating costs and changes in the federal government. Throughout 2008, there was significant back and forth between the Illinois congressional delegation and the federal government to continue the FutureGen project. A high degree of uncertainty over the process impacted the community and stakeholder engagement as the fate of the project was decided in

Washington, DC.

In August of 2010, DOE proposed a reconfigured FutureGen project to the State of Illinois using American Recovery and Reinvestment Act (ARRA) funding, assuming Mattoon would be the CO<sub>2</sub> storage location. The reconfigured project involved retrofitting an existing power plant with oxy-combustion technology that would deliver CO<sub>2</sub> via pipeline to the storage location. FutureGen 2.0 was to include a “Regional Carbon Storage Facility” and a training center for retrofit jobs and CCS-related jobs.

The FutureGen 2.0 announcement was made in a very public teleconference involving DOE, Senator Dick Durbin (D-IL), other key stakeholders, and the media. However, no advance notice was given to the local Illinois team. Ultimately, the community of Mattoon decided not to participate in FutureGen 2.0 and a new site was selected in Jacksonville, IL.

A major contributing factor to Mattoon’s decision to decline the project was the “roller coaster” of interaction related to DOE funding and decision-making processes. It is also unclear to what degree the local community understood the nuances of the complicated governmental processes taking place. What is clear is that the community lost confidence in the process and promises associated with the project. This has had a lasting impact in Mattoon to the point that, as late as 2020, the community would not consider carbon storage projects. For a full project timeline please see Appendix A3.

**KEY FINDING**

Uncertainty in federal decision-making processes related to the Future Gen project has had a lasting impact on community distrust of CCS projects.



# Part II: Federal Processes and Stakeholder Engagement

## ACTIVITIES CONDUCTED PRIOR TO PROJECT SITE SELECTION

Prior to the FutureGen carbon storage site selection, stakeholder engagement activities centered around informing communities of the opportunity to participate in what was being described as a “clean coal project” of global importance. A community’s willingness to host a project and interest in doing so were considered by the Alliance as part of the review criteria for awarding a project. Criteria were outlined through the Funding Opportunity Announcement (FOA) as part of the standard DOE evaluation process, in this case being conducted by the Alliance.

### KEY FINDING

Demonstrated community interest and willingness to host the project was a requirement for being selected as the project site by the FutureGen Alliance. A comparison study of different CCS projects across the globe identified several critical factors that may contribute to successful project deployment, of which community interest is key. These factors may be useful for assessing the quality of a DOE demonstration project proposals. The factors include:

- The extent to which key government and development team members are aligned in terms of support for, and coordination of, the project.
- The deployment of communication experts as part of the project team from the beginning.
- The consideration of social context/history in relation to site selection, project design, and implementation.
- The degree of flexibility in framing the project and adjusting the project implementation strategy.
- A degree of competition involving community self-selection for participation.

Adapted from: Ashworth et al. (2012). *What’s in Store*. International Journal of Greenhouse Gas Control 9: 402–409.

The Illinois Project Team, which included the DCEO, ISGS, local economic development offices, Patrick Engineering, and other contributors, began stakeholder engagement during the initial proposal preparation stage for proposals being submitted to the Alliance for site selection. Public meetings were held at each of the proposed project-host communities. The Illinois Project Team created a task force consisting of major community leaders, university presidents, trade groups, business developers, farming groups, industry, media, legislators, utilities, and many others to contribute to the understanding of CCS throughout the State and to support Illinois' bid to have a successful site proposal. Stakeholder engagement activities at this time included creating briefing material, frequently asked questions (FAQs), and materials to use when discussing FutureGen and CCS with constituents and stakeholders. Meetings were held to educate communities and stakeholders using hands-on, physical demonstrations such as rock samples and a 3-dimensional carbon sequestration model. Additionally, a variety of engagement activities were conducted by local economic developers, DCEO, ISGS, and the Alliance. The Alliance conducted many one-on-one meetings with landowners in homes, coffee shops, and town halls. Larger stakeholder meetings were also held in the Springfield, IL area for lawmakers and interested parties. Significant media coverage was also a component of the stakeholder engagement.<sup>3</sup> For a summary of stakeholder engagement providers and activities see Appendix A2.

#### **KEY FINDING**

Extensive stakeholder engagement took place throughout Illinois prior to a carbon storage site being chosen for the FutureGen project.

## **FACTORS FOR SUCCESS IN STAKEHOLDER ENGAGEMENT**

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The Illinois Project Team recognized early on that simple outreach alone was insufficient to bridge the communication challenges associated with carbon storage and that the project would benefit from multiple engagement strategies. The group relied heavily on actions that would be codified in the World Resources Institute's (WRI's) *Guidelines for Community Engagement in Carbon Dioxide Capture, Transport, and Storage Projects*, which call for "creating a culture of effective, two-way community engagement around CCS projects (see Appendix A2 for more insights on WRI Stakeholder Engagement Guidelines)."<sup>4</sup> The WRI guidelines form an integrated approach that can help

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3 Hund and Greenberg. (2012). *FutureGen Case Study*. Global CCS Institute. Canberra, Australia.

4 Forbes S, Almendra F, Ziegler M. (2010). *Guidelines for Community Engagement in Carbon Dioxide Capture, Transport, and Storage Projects*. World Resources Institute, Washington DC.

community leaders, project developers, and regulators understand the needs and perspectives of other stakeholder groups.

### **KEY FINDING**

Successful stakeholder engagement results in the goals and objectives of both the project developer and the community being met. Success can be determined by evaluating the degree to which local benefits have been defined and achieved, whether trust has been built, and whether two-way conversations are taking place. Criteria for assessing a stakeholder engagement plan should include:

- Information about who, what, where, when, and how engagement activities will take place and have taken place thus far.
- Information about the distribution of participating stakeholders and relevant groups, including considerations related to equity and inclusion (i.e., who is not at the table in addition to who is).
- Identification of local project benefits and perceived project risks based on engagement efforts conducted prior to the submission of a proposal, as well as mitigation strategies to build trust with the local community and respond to perceived risks.
- Strategies for ensuring that a community will gain access to information about continued project operations.
- Extent of local representation in the project (e.g., through employment opportunities).

It should be noted that following best practices when communicating and engaging with stakeholders about proposed CCS projects alone will not guarantee a successful project. Experience with FutureGen suggests that project teams need to be flexible and adapt planning and management throughout a project to be responsive to both project and stakeholder needs.

Lastly, it is also worth noting that it is impossible to predict at the outset of a project or at the project application stage what a complete stakeholder engagement strategy will be. Thus, the review and acceptance of stakeholder engagement plans needs to allow for flexibility and should be allowed to change over time to accommodate the emergent nature of stakeholder engagement. This should not be a barrier to application for federal projects.

## DOE'S ROLE IN STAKEHOLDER ENGAGEMENT

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DOE, as the funder of FutureGen, was an integral entity but not necessarily directly connected to stakeholders at the community level. Project management factors that related to finalizing DOE contracts and receiving DOE funding were unknown and invisible to community project advocates and had little direct, but significant indirect, impact on stakeholder engagement as members of the community were not aware of DOE processes, timelines, reporting, and other requirements.

An example of the formal component of stakeholder engagement occurred when DOE held public hearings as required under the National Environmental Protection Act (NEPA). Such hearings provide an official opportunity for stakeholders to testify and raise issues about a proposed project. Prior to each public hearing, the Illinois Project Team and the Alliance held informational sessions to answer questions from interested members of the public. These sessions included scientific demonstrations and displays where engineering experts, state officials, and other project proponents could answer questions in an informal setting. They are believed to have contributed to positive testimony during the official NEPA hearings, which focused on positive aspects of bringing FutureGen to Illinois and elicited very few negative comments. Potential project benefits, including jobs, economic opportunities for the host community, and the prestige of hosting an innovative facility, were perceived as much greater than potential project associated risks.

Stakeholder engagement activities were primarily funded through the State of Illinois DCEO, ISGS general state funding, local economic development offices, and the FutureGen Alliance. Stakeholder engagement is typically a fraction of the overall cost of a project and in the case of the Illinois project was included in project management costs. An estimated \$200,000–\$400,000 was spent on the ISGS portion of stakeholder engagement activities between 2006 and 2012.

### KEY FINDING

Stakeholder engagement was most effective when it was conducted by trusted local partners. DOE should enable stakeholder engagement by providing funding for such activities.

## IDENTIFYING RELEVANT STAKEHOLDERS AND COMMUNITIES

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The stakeholder analysis to identify individuals or groups that might have a stake or be impacted by a carbon storage project in the community was conducted by ISGS and the Alliance. The analysis collected demographic information, regional context, and historical environmental information, which also built on local knowledge. A “snowball” engagement approach that involved leveraging relationships and opportunities for one-on-one engagement was utilized so that as many stakeholders as possible could be engaged. State resources were used by ISGS to identify locations suitable for geologic storage of carbon. No federal tools, resources, or data sets were employed in designing the engagement process. This was possible because of the strong alignment that existed between the Illinois Project Team and the Alliance engagement professionals who interacted regularly with the local economic development officers.

### KEY FINDING

A robust stakeholder analysis was conducted to identify individuals or groups who might have a stake in or be impacted by the CCS project. Stakeholders identified as relevant to the carbon storage project were varied and widespread and included: state and local government officials, economic development officers, policymakers, representatives from industry (ethanol producers, oil and gas operators, coal), farmers, teachers, members of the general public, members of academia (from 2- and 4-year colleges and universities), staff of state science agencies, landowners, and other interested parties.

## **EFFECTS OF PROJECT EXIT ON STAKEHOLDERS**

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The FutureGen project did not proceed as planned after the announcement of Mattoon as the selected carbon storage site location. Mattoon was announced as the project location in December 2007 and throughout 2008 there was ambiguous information about whether the project would continue. The project was ultimately halted but subsequently re-envisioned, with significant changes, in 2010. This re-envisioning was announced by DOE in a very public way with little notification. Mistrust of the federal process and of DOE had been building throughout 2008; when a very different FutureGen 2.0 was introduced in 2010, the Mattoon community rejected it. The Alliance continued to work diligently on FutureGen 2.0 through 2015 when ARRA funding for the project ultimately expired due to congressional deadline (see timeline).

### **KEY FINDING**

The general population does not distinguish between steps in the federal funding process or fully understand their nuances. Therefore, DOE should ensure that there is as much communication and transparency as possible in its interactions with relevant communities and project leads about funding decisions and timelines.

# Part III: The Stakeholder Engagement Process

## GOALS OF STAKEHOLDER ENGAGEMENT

Stakeholder engagement efforts for carbon storage at FutureGen followed a set of well-established stakeholder engagement principles, as outlined by the International Finance Corporation (ICF),<sup>5</sup> WRI,<sup>6</sup> DOE,<sup>7</sup> and other organizations.<sup>8,9,10,11</sup>

- (a) travel throughout the state to present a physical model that demonstrates and explains the concept of CCS;
- (b) create and distribute educational and informational materials explaining CCS;
- (c) foster communication about CCS by attending public meetings, FutureGen-related meetings, conferences, professional development teacher education forums, science events for school children, and other venues as needed; and
- (d) work with educational experts from DCEO to develop new products and exhibits for use in classrooms and with the general public.

### KEY FINDING

Stakeholder engagement plans should have predefined, measurable objectives to ensure there are clear ways to assess success.

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- 5 IFC (2007). Stakeholder engagement: A good practice handbook for companies doing business in emerging markets. Retrieved from [IFC engagement handbook](#).
  - 6 Forbes S, Almendra F, Ziegler M. (2010). *Guidelines for Community Engagement in Carbon Dioxide Capture, Transport, and Storage Projects*. World Resources Institute, Washington DC.
  - 7 U.S. Department of Energy, National Energy Technology Laboratory. (2017). *Best practices for: Public outreach and education for carbon storage projects* (DOE/NETL/1845).
  - 8 Hund, G. E., Engel-Cox, J. A. (2002). Two-way responsibility: The role of industry and its stakeholders in working towards sustainable development. In J. Andriof, S. Waddock, B. Husted, & S. S. Rahman (Eds.), *Unfolding stakeholder thinking* (pp. 217–231). Sheffield, UK: Greenleaf.
  - 9 Wade, S., & Greenberg, S. (2011). *Social site characterisation: from concept to application*. Canberra, Australia: Global CCS Institute.
  - 10 Ashworth, P., Bradbury, J., Feenstra, C.F.J., Greenberg, S., Hund, G., Mikunda, T., Wade, S., & Shaw, H. (2011). *Communication/Engagement toolkit for CCS projects*. Canberra, Australia: Global CCS Institute.
  - 11 Bradbury, J., Greenberg, S., & Wade, S. (2011). *Communicating the risks of CCS*. Canberra, Australia: Global CCS Institute.

## STAKEHOLDER RESPONSE TO PROJECT COMPETITION

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The FutureGen FOA was set up as a competitive call for interested communities to self-select and be considered as a project host location. As such, the most promising project sites ranked high on technical merit *and* were able to demonstrate community enthusiasm. Self-selection for the Illinois sites proposed was found to be an effective stakeholder engagement ideal, in that it allowed communities to consider the pros and cons of hosting a project before making commitments to do so. Through this process, communities became invested in winning the project.<sup>12</sup>

The initial public response to the FutureGen opportunity often reflected cautious excitement about attracting a large carbon storage project that came attached to a “world renowned research center and state-of-the art power plant.” The Alliance and DOE touted the project’s potential to attract researchers and visitors from around the world. The public nature of the application and selection process created comradery and support between Illinois communities being considered for the project, while fueling a positive competitive spirit between local economic development offices. The attraction of FutureGen was very clearly and early identified in terms of its economic benefit.

Trust was also built by prolonged interactions that helped establish lasting relationships between project and engagement leads and stakeholders at multiple events and in various settings (e.g., open houses, site meetings, and one-on-one meetings in people’s homes). These repeat interactions allowed for information to be exchanged, questions asked, and re-engagement to occur until deep understanding and knowledge sharing occurred. Instead of “one-off” interactions, stakeholders had many opportunities to talk with project developers and experts.

### KEY FINDING

A key to the success of community engagement in the FutureGen project was the requirement of community buy-in as part of the selection criteria for a project site. This resulted in building excitement for the project in various communities and caused it to be viewed as something desirable by interested communities. As part of this, it is important to have clear and identifiable benefits for communities.

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<sup>12</sup> Hund and Greenberg. (2012). *FutureGen Case Study*. Global CCS Institute. Canberra, Australia.



## EVALUATION OF STAKEHOLDER ENGAGEMENT OUTCOMES

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Frequent evaluation to understand the effectiveness of engagement methods was a critical pillar of the stakeholder engagement process. Engagement was evaluated using standard social science methods including surveys, interviews, and repeat interactions. Mechanisms for collecting feedback included input cards, one-on-one discussions, interviews with engagement specialists, and open access to all town hall meetings and other engagement events.

Feedback from stakeholders was very helpful in outlining the dominant concerns of participating communities, while conducting the engagement process in an iterative manner made it possible to refine and expand the way ideas and information were presented and explained. Feedback also served as an important project management tool so that project developers could incorporate monitoring and other solutions to directly address community concerns. For example, in one instance, the ISGS was able to help a landowner with a groundwater issue that was impacting the landowner's family as a side benefit to the process of collecting baseline samples.

### KEY FINDING

Evaluation of stakeholder engagement, which was conducted on an ongoing basis while the project was active, had a positive effect in that it helped project developers redirect efforts to address community concerns as they arose.

## STAKEHOLDER UNDERSTANDING OF TECHNOLOGY RISK

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Responses to the risks associated with the FutureGen carbon storage project were mixed. The technology, once explained, was widely understood. One stakeholder group in particular, farmers, had sophisticated knowledge of the soil zone and how physical properties such as pressure and temperature might impact land use if used for carbon storage. For the most part, community members' questions and concerns centered on immediate and local impacts. A main concern for the public was health and environmental safety. For example, communities often had questions about if storing CO<sub>2</sub> in the subsurface would contaminate groundwater, cause earthquakes, or result in CO<sub>2</sub> buildup in confined spaces such as basements. Other concerns were related to emission stream composition, project noise, and soil contamination.

Financial responsibility was another subject of concern. Stakeholders wanted to know who would take responsibility for stored CO<sub>2</sub> when the project was over. Due to the competitive nature of the project, the Illinois legislature passed a law to transfer long-term liability for stored CO<sub>2</sub> to the state government upon project completion. It is important to note that the state has not agreed to a similar transfer of liability for other CCS projects in Illinois since FutureGen. Overall, as stated previously, most stakeholders perceived the potential benefits of the project as greater than the potential risks.

**KEY FINDING**

Open acknowledgment and communication about the risks and impacts of carbon storage during stakeholder engagement was key to building community trust in the FutureGen project.

# Part IV: Summary for Policymakers

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## KEY FINDINGS

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### Assessment of project proposals in the FutureGen competition

- **Selection criteria for the initial FutureGen carbon storage project site selection were varied and included aspects of stakeholder interest, not just technical feasibility.** Factors considered in project site selection included: geology, proximity of CO<sub>2</sub> source, local and regional government interest, benefit/cost analysis, risk profile and perceptions, public opinion, government alignment, industrial partners, infrastructure, policy, and more.
- **A key to the success of community engagement in the FutureGen carbon storage project was the requirement of community buy-in as part of the selection criteria for a project site.** This resulted in building excitement for the project in various communities and caused it to be viewed as something desirable by interested communities. It is important to have clear and identifiable benefits for communities.
- **Demonstrated community interest and willingness to host the carbon storage project was a requirement for being selected as the project site by the FutureGen Alliance.** A comparison study of different CCS projects across the globe identified several critical factors that may contribute to successful project deployment, of which community interest is key. These factors may be useful for assessing the quality of a DOE demonstration project proposals, which include:
  - The extent to which key government and development team members are aligned in terms of support for, and coordination, of the project.
  - The deployment of communication experts as part of the project team from the beginning.
  - The consideration of social context/history in relation to site selection, project design, and implementation.
  - The degree of flexibility in framing the project and adjusting the project implementation strategy.
  - A degree of competition involving community self-selection for participation.

Adapted from: Ashworth et al. (2012). *What's in Store*. International Journal of Greenhouse Gas Control 9: 402–409.

## Timelines for stakeholder engagement activities

- **Extensive stakeholder engagement took place throughout Illinois prior to a carbon storage site being chosen for the FutureGen project.** The alignment of federally funded project objectives, state interest, local benefits, and local subject matter experts was a significant factor in stakeholder engagement success in the Illinois FutureGen project.
- **Stakeholder engagement activities centered on education and gaining trust around geologic carbon storage were initiated three years prior to launching the FutureGen competition.** Trusted experts at the state level conducted integrated and objective stakeholder engagement representing multiple voices, disciplines, and perspectives in the state and in relevant communities.
- **The general population does not distinguish between steps in the federal funding process or fully understand their nuances.** Therefore, DOE should ensure that there is as much communication and transparency as possible in its interactions with relevant communities and project leads about funding decisions and timelines. Uncertainty in federal decision-making processes related to the FutureGen project has had a lasting impact on community distrust of CCS projects in Mattoon, IL.

## Considerations for successful stakeholder engagement

- **Successful stakeholder engagement results in the goals and objectives of both the project developer and the community being met.** Stakeholder engagement plans should have predefined, measurable objectives to ensure there are clear ways to assess success. Success can be determined by evaluating the degree to which local benefits have been defined and achieved, whether trust has been built, and whether two-way conversations are taking place. Criteria for assessing a stakeholder engagement plan should include:
  - Information about who, what, where, when, and how engagement activities will take place and have taken place thus far.
  - Information about the distribution of participating stakeholders and relevant groups, including considerations related to equity and inclusion (i.e., who is not at the table in addition to who is).
  - Identification of local project benefits and perceived project risks based on engagement efforts conducted prior to the submission of a proposal, as well as mitigation strategies to build trust with the local community and respond to perceived risks.
  - Strategies for ensuring that a community will gain access to information about continued project operations.

- Extent of local representation in the project (e.g., through employment opportunities).

It should be noted that following best practices when communicating and engaging with stakeholders about proposed CCS projects alone will not guarantee a successful project. Experience with FutureGen suggests that project teams need to be flexible and adapt planning and management throughout a project to be responsive to both project and stakeholder needs.

Lastly, it is also worth noting that it is impossible to predict at the outset of a project or at the project application stage what a complete stakeholder engagement strategy will be. Thus, the review and acceptance of stakeholder engagement plans needs to allow for flexibility and should be allowed to change over time to accommodate the emergent nature of stakeholder engagement. This should not be a barrier to application for federal projects.

- **Stakeholder engagement was most effective when it was conducted by trusted local partners.** DOE should enable stakeholder engagement by providing funding for such activities.
- **A robust stakeholder analysis was conducted to identify individuals or groups who might have a stake in or be impacted by the carbon storage project.** Stakeholders identified as relevant to the carbon storage project were varied and widespread, and included: state and local government officials, economic development officers, policymakers, representatives from industry (ethanol producers, oil and gas operators, coal), farmers, teachers, members of the general public, members of academia (from 2- and 4-year colleges and universities), staff of state science agencies, landowners, and other interested parties.
- **Evaluation of stakeholder engagement, which was conducted on an ongoing basis while the project was active, had a positive effect in that it helped project developers redirect efforts to address community concerns as they arose.** Open acknowledgment and communication about the risks and impacts of carbon storage during stakeholder engagement was key to building community trust in the FutureGen project.

## **LESSONS LEARNED**

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### **Lesson 1: Stakeholder engagement readiness should be demonstrated at the application stage.**

All projects, especially those that receive federal funding, should demonstrate understanding and readiness to engage stakeholders. DOE has a significant role to play in this regard when reviewing and awarding proposals. A good stakeholder engagement plan should answer the following questions:

- Does the plan demonstrate a thorough understanding of local, regional, and state stakeholders?
- Does the plan account for changes in stakeholder engagement processes over time?
- How will stakeholder engagement be defined, tracked, implemented, measured, and refined?
- Does the plan accommodate formative (real-time) and summative (end) evaluation of stakeholder engagement activities?
- Does the plan clearly identify key stakeholder groups?
- Does the plan recognize which stakeholders are NOT at the table, are under-represented, or are missing? Is there a roadmap for seeking out these stakeholders and engaging them?
- Who is on the stakeholder engagement team? Does the team collectively represent a variety of views, expertise, and sectors?
- Does the plan demonstrate a thorough understanding of social risk associated with a project and have processes in place to monitor public sentiment through media reports or other available data?
- Does the plan have an emergent, evolving component? Does it take into account the time needed to evolve stakeholder engagement processes and imbed trusted personnel?
- How does the plan address specific stakeholder organizations with concerns such as environmental justice, climate justice, and energy justice?

## **Lesson 2: Effective stakeholder engagement requires sustained knowledge sharing that is not tied to political cycles.**

Carbon capture and storage projects take time to complete. As such, there are significant challenges in maintaining interest and knowledge among stakeholders. In particular, the political cycles change and lawmakers in office at the beginning of a project may not remain in office when a project nears completion. There is a need for a continual knowledge sharing component of projects. However, this can also be challenging because of information fatigue and if no new results are occurring. Navigating this balance is enhanced for projects that expect to store CO<sub>2</sub> long-term. Considerations for this extended timeline should be accounted for in stakeholder engagement planning. DOE may be able to provide the necessary continuity and fulfill the need for long-term institutional knowledge.

### **Lesson 3: Alignment of local interest with federally-funded project objectives is critical to meaningful stakeholder engagement.**

The alignment of federally-funded projects, state interest, local benefits, and local subject matter experts was a significant factor in the stakeholder engagement success in Illinois. State and local officials, Illinois DCEO, Illinois Department of Natural Resources, universities, farmer's bureaus, industry, power sector, teachers, landowners, all played a role in the successful bid for FutureGen. This unique alignment of interests led to a shared understanding of the benefits and risks associated with this project.

### **Lesson 4: Stakeholder engagement should be rooted in best practices and conducted at the local level.**

Building relationships with local stakeholders throughout the early stages of projects is essential. Ideally, these interactions are conducted in small groups or one-on-one where stakeholders can voice concerns and ask questions. Local and regional stakeholder engagement efforts build trust based on shared experience and pre-existing relationships. Further, multiple interactions with the same stakeholders is critical. Stakeholders often need time and repeated engagement to gain conceptual understanding, ask questions, and gain familiarity with novel technologies.

Lastly, it is critical to understand and respect differences and tailor engagement approaches as needed (e.g., meet with landowners in their homes, organize meetings with stakeholders that have shared concerns, hold meetings at times that accommodate different schedules). Stakeholder engagement teams should consist of a variety of voices, from expert to local officials. It is important for stakeholders to hear multiple perspectives during their decision-making process.

### **Lesson 5: Stakeholder engagement and communications planning are critical on-going activities and should be funded adequately, including by federal funds.**

To ensure meaningful stakeholder engagement, development of a plan is necessary and should be developed early. Moreover, a stakeholder engagement plan is a function of growing an understanding of local and regional contexts and therefore should remain a dynamic plan through the project lifecycle. Stakeholder engagement is ever-changing landscape and project personnel (those doing engagement on behalf of government or project) need to allow and plan for emergent opportunities and understanding. Stakeholder engagement planning is best executed as an integral project management function and benefits from dedicated resources.

# Conclusion

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The carbon storage element of the FutureGen project in Illinois provides a case study for successful stakeholder engagement for a DOE demonstration project. In this project, several factors contributed to engagement success including alignment between state, local, and regional objectives, thoughtful engagement conducted by trusted local actors, and establishment of and assessment on progress towards engagement goals. As DOE funds major energy projects in the future, the appropriate federal role must be clearly defined. DOE can facilitate the successful demonstration and deployment of clean energy technologies by developing and implementing clear and robust stakeholder engagement assessments, funding projects that meet the goals of both project developers and local communities and being transparent about project decisions and processes at the federal level.



# About the Authors

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Dr. Greenberg has been actively engaged in the carbon capture and storage research space for more than 25 years. Her work starts at the intersection of science, society, and the environment. A pragmatist at heart, she strives to understand and create opportunities for conversation about energy, climate change mitigation, and an energy transition. Through leadership of the Illinois Basin - Decatur Project and two Regional Carbon Sequestration Partnerships, Dr. Greenberg has experience in all aspects of CCS project development, stakeholder engagement, permitting, monitoring, and knowledge sharing.

## **Tanya Das, Ph.D.**

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Dr. Das is an engineer who uses her problem-solving skills to strengthen U.S. government initiatives that help climate innovators go from idea to market. Leveraging her experience in academia and government, she influences policy related to energy technology scaleup, the federal research landscape, public-private partnerships, manufacturing, and workforce development. She previously served the Biden Administration as the Chief of Staff of the Office of Science at the U.S. Department of Energy and spent several years in Congress advancing bipartisan policy in energy, climate change, and manufacturing.

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Dr. Tesfaye is an experienced clean energy researcher and working to design federal policy interventions that alleviate the negative impacts of climate change. Tesfaye combines her policy and basic science research experience in topics like biomass, clean hydrogen, industrial decarbonization, carbon removal and climate mitigation technologies to develop policies that enable equitable & meaningful deployment of climate solutions.

# Appendix

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## A1. LIST OF ACRONYMS

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<b>ARRA</b>	American Recovery and Reinvestment Act
<b>CCS</b>	Carbon capture and storage
<b>CO<sub>2</sub></b>	Carbon dioxide
<b>DCEO</b>	Illinois Department of Commerce and Economic Opportunity
<b>FAQs</b>	Frequently Asked Questions
<b>FOA</b>	Funding Opportunity Announcement
<b>the Alliance</b>	FutureGen Alliance
<b>EIS</b>	Environmental Impact Statement
<b>EIV</b>	Environmental Impact Volume
<b>IBDP</b>	Illinois Basin – Decatur Project
<b>ISGS</b>	Illinois State Geological Survey
<b>IGCC</b>	Integrated gasification combined cycle
<b>MGSC</b>	Midwest Geological Sequestration Consortium
<b>NEPA</b>	National Environmental Protection Act
<b>ROD</b>	Record of Decision
<b>RCSPs</b>	Regional Carbon Sequestration Partnerships

## **A2. STRATEGIES FOR DESIGNING SUCCESSFUL STAKEHOLDER ENGAGEMENT**

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The Regional Carbon Sequestration Partnerships (RCSPs) were initiated by DOE to create understanding about CCS in specific regions while also conducting geologic studies and demonstrating CCS as a safe and viable technology. The RCSPs are a unique set of organizations that have become the brain trust of CCS in the United States. They continue to provide technical assistance, stakeholder engagement support, and knowledge sharing platforms that are driving CCS progress. The DOE Best Practices Manual for Outreach developed by the RCSPs outline key questions that project applicants should at the very least demonstrate they have the ability to conduct and have considered:<sup>13</sup>

- timing of engagement strategies
- importance of gaining knowledge about the community
- identification of local benefits and perceived risks of the project
- understanding of what to communicate
- understanding of how to communicate and engage
- use of appropriate sources of information

Building off these principles, the WRI Guidelines recognize that interaction between community leaders, project developers, and regulators is necessary for successful engagement. The WRI Guidelines go further in breaking down roles and responsibilities for each of these three groups along five key principles of CCS stakeholder engagement:

1. understanding local community context,
2. exchanging project information,
3. identifying level of engagement,
4. discussing project risks and benefits, and
5. Continuing engagement through time.

It is important to understand a community and/or project location from multiple perspectives and this involves understanding the history of a location. Through stakeholder and situational analysis, it is important to learn a range of topics about communities, for example, what previous environmental or land use problems may be present, beliefs and perceptions of science and engineered solutions, perspectives on pipeline construction, need for jobs, what

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13 United States Department of Energy. *Best Practices for: Public Outreach and Education for Carbon Storage Projects*. DOE/NETL-2009/1391, Morgantown, WV (2009).

would benefit a community, how community views itself, and the community's core values.

Key observations include that background, generational influence, and social characteristics of a community may provide increased stakeholder understanding. Seeking input from audiences about what information will be of interest to them and providing that information in a timely manner is beneficial to engagement. There also needs to be time allowed for audiences to absorb information and keeping lines of communication open to answer additional questions as they arise.

Lastly, it is critical to understand where people get their information and to provide access to technical, objective experts and resources of information. Using a variety of engagement approaches is also key to maximizing effective stakeholder engagement.

### A3. PROJECT TIMELINE

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This timeline is adapted from a report from the Congressional Research Service.<sup>14</sup>



**February 2003**

President Bush proposes a 10-year, \$1 billion project to build a coal-fired power plant that would integrate carbon sequestration and hydrogen production.

**October 2003**

DOE Regional Carbon Sequestration Partnerships form.

**July 2004**

The FutureGen Industrial Alliance forms.

**December 2006**

DOE and the Alliance sign a Cooperative Agreement partnering in all development aspects of the \$1 billion FutureGen project, including site and technology selection, construction, and operation.

**March 2006**

The Alliance releases the final Request for Proposals for regions interested in hosting the world's first coal-fueled "zero emissions" power plant.

**July 2006**

The Alliance selects four finalist hosting sites for FutureGen.

**January 2007**

The Alliance produces an initial conceptual design report for the original FutureGen project estimating the cost of the program at \$1.8 billion.

**March 2007**

DOE and the Alliance sign a Cooperative Agreement stipulating that DOE will cover 74% and the Alliance would share the remaining 25% of the \$1.8 billion.

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<sup>14</sup> Adapted from: Folger, P. (2014). *The FutureGen Carbon Capture and Sequestration Project: A Brief History and Issues for Congress*. Congressional Research Service.

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- May 2007**

DOE releases a Draft Environmental Impact Statement (EIS) that includes a review of all four candidate sites in Illinois and Texas as part of the NEPA process.
  - November 2007**

DOE releases the Environmental Impact Statement (EIS) as part of the NEPA process, predicting program costs at \$1.8 billion.
  - December 2007**

Given rising costs of FutureGen development, DOE attempts to negotiate a new cost-sharing arrangement before continuing the Cooperative Agreement. DOE advises the Alliance not to announce the selected plant site. Later that month, the Alliance announces the selection of Mattoon, IL as the final site to host the FutureGen power plant.
  - May 2008**

DOE releases a draft Funding Opportunity Announcement for a restructured FutureGen project.
  - June 2008**

DOE formally discontinues its cost-share with the Alliance for FutureGen.
  - February 2009**

The American Recovery and Reinvestment Act provides \$1.073 billion to the FutureGen program to advance construction of a plant built in Mattoon, IL.
  - June 2009**

DOE issues the Record of Decision (ROD), a final public decision part of the NEPA process that certifies that the Mattoon, IL site meets environmental requirements for the project.
  - August 2010**

Energy Secretary Chu announces the new FutureGen 2.0 project. Mattoon, IL is removed from participation in the FutureGen 2.0 project.
  - December 2015**

Future Gen 2.0 activities halted due to expiration of ARRA funding.

## **A4. SUMMARY OF STAKEHOLDER ENGAGEMENT PROVIDERS AND ACTIVITIES**

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<b>Key Player</b>	<b>Stakeholder engagement Activities</b>
<b>The Alliance</b>	Meetings with Illinois Project Team, landowner meetings, open houses, participation in NEPA and public hearing events
<b>MGSC/ISGS</b>	All the above + educational events, informational sessions, outreach material development, technical assistance and support
<b>DOE</b>	Participation in formal engagement such as hearings and Alliance meetings
<b>Economic Development Officers (Coles and Douglas Counties)</b>	All of the above + One-on-one meetings with constituents, local government meetings and support, engagement with County board







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