the ENERGY lab

BEST PRACTICES for:

Public Outreach and Education for Carbon Storage Projects

First Edition

NATIONAL ENERGY TECHNOLOGY LABORATORY

U.S. DEPARTMENT OF ENERGY

Disclaimer

Cover Photos

Top Left: SECARB teacher training session

Center: MGSC–Illinois Geological Survey CO_2 storage demonstration

Bottom Left: SECARB tour of Plant Daniel CO_2 pilot injection
(Credit: Southern Company–Mississippi Power)

Bottom Right: BSCSP information session

Public Outreach and Education for Carbon Storage Projects

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List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
3-D	Three-Dimensional
Big Sky	Big Sky Carbon Sequestration Partnership
CBM	Coalbed Methane
CCP	CO_2 Capture Project
CCS	Carbon Capture and Storage
CO_2	Carbon Dioxide
CSI	Climate Status Investigations
DOE	U.S. Department of Energy
ECBM	Enhanced Coalbed Methane
EERC	Energy and Environmental Research Center
EIS	Environmental Impact Statement
EOR	Enhanced Oil Recovery
EPA	U.S. Environmental Protection Agency
FEP	Features, Events, and Processes
GCCC	Gulf Coast Carbon Center
GIS	Geographic Information System
GHG	Greenhouse Gas
H_2S	Hydrogen Sulfide
IABC	International Association of Business Communicators
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
LBNL	Lawrence Berkeley National Laboratory
MGSC	Midwest Geological Sequestration Consortium
MIT	Mechanical Integrity Test
MRSCP	Midwest Geological Carbon Sequestration Consortium
NATCARB	National Carbon Sequestration Database and Geographical Information System
NETL	National Energy Technology Laboratory
NEPA	National Environmental Policy Act
NGO(s)	Non-Governmental Organization(s)
OWG	Outreach Working Group
PCOR	Plains CO_2 Reduction Partnership
PPE	Personal Protection Equipment
PRSA	Public Relations Society of America
RCSP	Regional Carbon Sequestration Partnership
SECARB	Southeast Regional Carbon Sequestration Partnership
SWP	Southwest Regional Partnership
UIC	Underground Injection Control
WESTCARB	West Coast Regional Carbon Sequestration Partnership

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Executive Summary

This manual represents a distillation of best practices for public outreach and education to support carbon dioxide (CO_2) storage projects; it is derived from the experiences of the seven Regional Carbon Sequestration Partnerships (RCSPs). Within the scope of the RCSP initiative, the partnerships have recognized the importance of conducting public outreach in tandem with the pilot-scale field tests. The goal of these field tests is to validate CO_2 storage opportunities in each of the RCSP regions. Results obtained from these efforts are providing the foundation for future commercialization efforts – and even more extensive outreach efforts. The best practices highlighted in this manual add a valuable perspective by addressing the practical implications of implementing CO_2 storage projects across a variety of U.S. geologic and cultural settings. The objective of the Public Outreach and Education for Carbon Storage Projects Best Practices Manual is to communicate the lessons learned and to recommend best practices emerging from the first six years of public outreach conducted by the seven RCSPs. The manual is intended to assist project developers in understanding and adopting best practices in outreach to support CO_2 storage projects. Although project developers are the primary audience for this document, other stakeholders may find the contents of this document of interest.

Early CO_2 storage projects have been highly visible and their success will likely impact future CO_2 storage projects. The primary lesson learned from the RCSPs' experience is that public outreach should be an integrated component of project management. Conducting effective public outreach will not necessarily ensure project success, but underestimating its importance can contribute to delays, increased costs, and community ill will. Effective public outreach involves listening, sharing information, and addressing concerns through proactive community engagement. The intent of the individuals who have contributed to this document is to facilitate project success and boost the effectiveness of outreach efforts. The following best practices represent a framework for designing an outreach program associated with a CO_2 storage project. Based on the specific characteristics of a planned project, the project developers, and the community in which the project is planned, some of these best practices may be more relevant than others. This manual was developed as a means to share the experience gained to date and inform future project developers.

Best Practice 1: Integrate Public Outreach with Project Management

Best Practice 2: Establish a Strong Outreach Team

Best Practice 3: Identify Key Stakeholders

Best Practice 4: Conduct and Apply Social Characterization

Best Practice 5: Develop an Outreach Strategy and Communication Plan

Best Practice 6: Develop Key Messages

Best Practice 7: Develop Outreach Materials Tailored to the Audiences

Best Practice 8: Actively Oversee and Manage the Outreach Program throughout the Life of the CO_2 Storage Project

Best Practice 9: Monitor the Performance of the Outreach Program and Changes in Public Perceptions and Concerns

Best Practice 10: Be Flexible – Refine the Public Outreach Program as Warranted


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Public Outreach and Education for Carbon Storage Projects

1.0 Introduction

Carbon dioxide (CO_2) is the most common anthropogenic greenhouse gas (GHG). According to the U.S. Environmental Protection Agency (EPA), the United States emitted roughly 6.2 billion tons of CO_2 in 2006 due to the combustion of fossil fuels.[1] Nearly 40 percent of these emissions were due to combustion of fossil fuels to generate electricity.[2] Carbon capture and storage (CCS) is an emerging strategy for preventing the emission of anthropogenic CO_2 into the atmosphere. The long-term storage of anthropogenic CO_2 is a promising technology for slowing, and ultimately reversing, the buildup of GHG emissions in the atmosphere. Carbon dioxide storage can take place in several settings, including terrestrial ecosystems (biomass, soils, and trees), oceans, and deep geologic formations. The latter, known as geologic CO_2 storage (or sequestration), is the focus of this manual and is referred to as "CO_2 storage" hereafter. Underground geologic features, such as depleted oil and gas reservoirs; unmineable coal beds; and deep, brine-filled (saline) rock formations, are all potentially suitable reservoirs for secure, long-term CO_2 storage.

The U.S. Department of Energy (DOE) estimated a potential storage capacity of 3,900 billion tons of CO_2 within geologic reservoirs in the United States and parts of Canada.[3] This capacity estimate is sufficient to store CO_2 emissions for at least several centuries from large "point sources" in these two countries at current emission rates. The Intergovernmental Panel on Climate Change (IPCC) states, "…to continue to extract and combust the world's rich endowment of oil, coal, peat, and natural gas at current or increasing rates, and so release more of the stored carbon into the atmosphere, is no longer environmentally sustainable, unless CCS technologies currently being developed can be widely deployed."[4] The prospect of achieving significant CO_2 emission cuts through CO_2 storage has led to growing interest and investment by governments and the private sector to develop the necessary technology and to demonstrate how this approach can be safely and effectively implemented.

One of the prominent CO_2 storage demonstration programs in the United States is DOE's Regional Carbon Sequestration Partnership (RCSP) Initiative managed by DOE's National Energy Technology Laboratory (NETL). The RCSP Initiative has the goal of developing a network of public-partnerships at the regional level to lay the groundwork for practical and environmentally sound CO_2 storage. In Fall 2003, DOE funded seven regional partnerships to work with regional experts to identify and characterize major CO_2 sources; identify and characterize major geologic zones suitable for storage of CO_2; address regulatory needs, best practices, and CO_2 storage project opportunities; and undertake outreach and education (see Appendix 1 for additional information).

At the onset of the RCSP Initiative, CO_2 storage was unknown to many audiences, including policy developers, community leaders, nongovernmental organizations (NGOs), educators, and the general public. During the early years of the RCSP Initiative, public opinion surveys revealed little public familiarity with the term "CO_2 storage" and even less understanding of the meaning of the term.[5, 6] Low public awareness, combined with related concerns

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1 U.S. EPA, "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006," Table 2-5: CO_2 Emissions For Fossil Fuel Combustion By End Use Sector, Washington, DC (2008).

2 Ibid.

3 DOE – Office of Fossil Energy (FE), NETL: Carbon Storage Atlas of the United States and Canada, Second Edition, 2008.

4 B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds), "Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change," 2007, Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

5 Curry, T.E., D.M. Reiner, M.A. de Figueiredo, and H.J. Herzog, "A Survey of Public Attitudes towards Energy and Environment in Great Britain," March 2005.

6 Reiner, D.M., T. Curry, M. de Figueiredo, H. Herzog, S. Ansolabehere, K. Itaoka, M. Akai, F. Johnsson, M. Odenberger, "An International Comparison of Public Attitudes towards Carbon Capture and Storage Technologies," presented at the 8th International Conference on Greenhouse Gas Control Technologies, Trondheim, Norway, June 2006.

on climate science and fuel preferences, suggested that ongoing outreach and education would be critical to boosting the public's understanding of CO_2 storage and to getting their informed input to project implementation decisions. These concerns include: the degree to which an individual believes climate change is occurring and could personally affect his or her way of life; the feasibility of other carbon-reducing options; the status of CO_2 storage as an emerging technology with potential risks; and environmental concerns over expanded use of coal, petroleum products, or other fuels.

In recognition of the importance and complexity of the issues involved with CCS, DOE charged the RCSPs with developing and implementing an outreach and education program that would:

- Raise the awareness and understanding of the general population in the RCSP regions with respect to long-term CO_2 storage in geologic formations for GHG reduction.
- Focus outreach on audiences in areas where CO_2 storage validation tests or long-term demonstrations are planned.

The significant technical underpinnings for CO_2 storage are found in the processes of enhanced oil recovery (EOR) (where CO_2 is injected into mature oil fields to help lower the viscosity of residual oil that might not be recovered otherwise), underground natural gas storage, and disposal of industrial fluid wastes in the subsurface. There is extensive information available that describes the discovery of CO_2 in the subsurface; the history of CO_2 use in EOR and now the new application in geologic storage; the geologic occurrence of CO_2; and the underlying technologies of CO_2 capture, transport, and underground storage and monitoring. However, access to information is of little use if the efforts for sharing that information are poorly matched to the needs of the target audiences. This manual represents a distillation of best practices for outreach and education derived from the experience of the seven RCSPs that have conducted CO_2 storage field verification tests and are now planning and/or conducting large-scale CO_2 storage demonstrations in their respective regions. These best practices add a valuable perspective by addressing the practical implications of implementing CO_2 storage projects across a variety of U.S. geologic and cultural settings. The manual represents a framework for designing an outreach program associated with a CO_2 storage project. Based on the specific characteristics of a planned project, the project developers, and the community in which the project is planned, some of these best practices may be more relevant than others. This manual is intended to assist project developers in understanding and adopting outreach best practices to support CO_2 storage projects. Although project developers are the primary audience, other stakeholders will likely find this manual of interest.

The Lifecycle and Parameters of CO_2 Storage Projects

Most CO_2 storage projects will unfold through a series of overlapping stages, including project conceptualization and fundamental source/sink matching, site screening and selection, site characterization, project design and permitting, project operations, closure, and post-closure monitoring and environmental stewardship (See Figure 1-1). In some stages, obtaining legal or regulatory permission for several aspects of a project, such as access to public and private property, use of pore space, and permits for drilling and CO_2 injection, will necessitate some level of public interaction on behalf of the project team. Furthermore, most organizations strive to develop and maintain good relations with the communities where their facilities are located. One goal of public outreach is to establish open lines of communication between project developers and a host community; this will provide a means to solicit community input, build trust, and ensure the community that the project will be safely and responsibly carried out. In many cases the developer may have longstanding relationships with the community where a project might occur. When this is true, a goal of public outreach is to build on those relationships.

Despite important differences, CO_2 storage projects all share some common characteristics – they occupy land at the surface of the earth, as well as a three-dimensional (3-D) space in the subsurface. As such, CO_2 storage projects have a highly visible surface component and a subsurface component that can only be visualized through the use of monitoring technologies.

CCS projects may be affiliated with existing CO_2 sources (i.e., industrial plants) or they may be part of a plant expansion or a new development. Thus, local stakeholders may have a long history with the

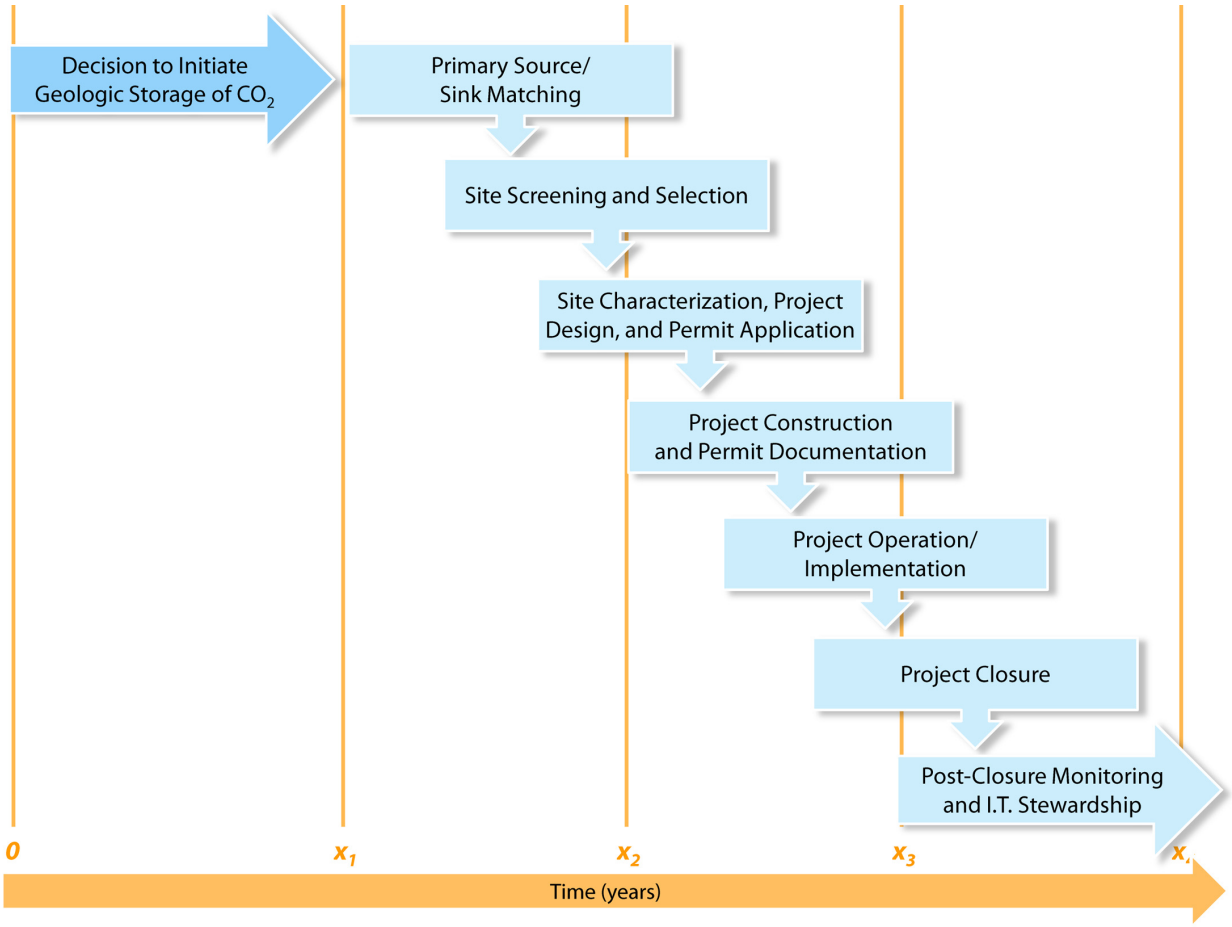

Figure 1-1: Public Outreach Process Flow Chart

CO_2 source or, in the case of a new facility, may be unfamiliar with both the operator and the CO_2 storage operations proposed in conjunction with the new facility. In the future, projects may also take the form of central regional CO_2 repositories serving a number of CO_2 sources linked by pipeline(s).

In addition, the level of activity at a CO_2 storage project site can range from minimal alterations to oil field equipment in the case of an EOR project to major engineering projects that entail alterations to the CO_2 source, pipeline construction, drilling injection wells, and installing monitoring systems.

Public Outreach – What Is It? Why Is It Necessary?

Public outreach involves both the transfer of information and a means to gauge the success of the transfer. It begins at the onset of the project, continues through the close of the project, and involves each individual on the project team. In addition, public outreach encompasses an array of activities through which information about CO_2 storage projects is shared with, and feedback is obtained from, stakeholders. In this context, stakeholders are the parties who believe they are most affected by CO_2 storage project decisions.[7] Hence, the group of relevant stakeholders for a particular project will be somewhat self-defined based on the project specifics.

When done effectively, public outreach can be used to help identify the main values and concerns of a host community as well as the perceived benefits of a proposed project. This understanding can help a project team to foster public acceptance by addressing the issues of relevance to a particular community. However, it should be noted that public outreach, even when done well, does not guarantee public acceptance of a given CO_2 storage project.

[7] Cox, Robert. 2009 Edition. Environmental communication and the public sphere. Sage Publications, Thousand Oaks, California, USA.