# 1 PURPOSE AND NEED FOR AGENCY ACTION

## 1.1 INTRODUCTION

The United States (U.S.) Department of Energy (DOE) prepared this Environmental Impact Statement (EIS) to evaluate the potential environmental, cultural, and socioeconomic impacts associated with the DOE Proposed Action of providing financial assistance for the Mountaineer Commercial Scale Carbon Capture and Storage (CCS) Project (Mountaineer CCS II Project) under the Clean Coal Power Initiative (CCPI) Program.

DOE prepared this EIS pursuant to the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] 4321 *et seq.*), and in compliance with the Council on Environmental Quality (CEQ) implementing regulations for NEPA (40 *Code of Federal Regulations* [CFR] 1500 through 1508) and DOE's NEPA implementing procedures (10 CFR 1021). Chapter 1 of the EIS provides an overview of the Proposed Action and a description of the purpose and need for DOE action. This chapter also includes information on the NEPA process and the "scoping" efforts completed by DOE during planning and development of the EIS. "Scoping" refers to the public, tribal, and agency outreach efforts that DOE undertook early in the process to focus this NEPA analysis on the appropriate issues (please see 40 CFR 1501.7 and Section 1.6 for more information).

## 1.2 CCPI PROGRAM

Congress established the CCPI Program to enable and accelerate the deployment of advanced technologies to ensure clean, reliable, and affordable electricity for the U.S. The CCPI operates as a cost-shared partnership between government and industry to develop and demonstrate advanced coal-based power generation technology at the commercial scale. CCPI demonstrations address the reliability and affordability of the nation's electricity supply and further the objectives of the Energy Policy Act of 2005 (EPAct05). The overall goals of the CCPI are to: (1) increase investment in low-emission, coal-based power generation technology, consistent with the EPAct05 (Public Law 109-58); and (2) accelerate the development and demonstration of advanced coal technologies for commercial use. By providing federal assistance, potential solutions to inherent financial and technical risks (on the part of the commercial sector) associated with bringing advanced technology to the marketplace can be more rapidly developed. In this manner, the CCPI accelerates the development of new coal technologies and facilitates the commercial acceptance of these emerging technologies.

The CCPI legislation specifically directs DOE to demonstrate coal-based technology advancements, thereby reducing barriers to the continued and expanded use of coal to generate electricity. When integrated with other DOE initiatives, the CCPI will help the nation successfully commercialize these advanced technologies. Such technologies will produce electricity at greater efficiencies, attain near-zero emissions, and produce clean fuels consistent with the EPAct05. By reducing emissions, the CCPI also directly supports the Climate Change Technology Program (CCTP) to reduce emissions of carbon dioxide ($CO_2$), a greenhouse gas (GHG). The CCTP is the planning and coordination entity that assists the government in carrying out the President's National Climate Change Technology Initiative. Its purpose is to accelerate the development and deployment of technologies that can reduce, avoid, or capture and store GHG emissions. The CCTP was established in 2002 with several participating federal agencies, including the U.S. Environmental Protection Agency (EPA) and DOE.

**Carbon dioxide ($CO_2$)** accounts for 83 percent of the total U.S. GHG emissions. As of 2008, the $CO_2$ emissions from U.S. electricity generation had grown 30 percent since 1990, while in comparison, total $CO_2$ emissions (from all reported U.S. sources) grew by only 16 percent. Electrical power generation contributes 41 percent of all $CO_2$ emissions in the U.S. In 2008, 82 percent of all $CO_2$ emissions from U.S. electricity generation was attributable to the use of coal (EIA, 2009b).

DOE selects the CCPI projects for financial assistance through funding opportunity announcements (FOA) that solicit applications for federal cost-sharing for demonstration projects. To date, the CCPI Program has conducted three rounds of solicitations:

- *Round 1* sought projects that would demonstrate advanced technologies for power generation and improvements in plant efficiency, economics, and environmental performance.
- *Round 2* requested applications for projects that would demonstrate improved mercury controls and gasification technology.
- *Round 3* which DOE conducted in two phases, sought projects that would demonstrate advanced coal-based electricity generating technologies that capture and sequester (or put to beneficial use) $CO_2$ emissions. The Round 3 solicitation was restricted to coal-based power generation, with a specific objective to demonstrate advanced coal-based technologies that capture and sequester (or put to beneficial use) $CO_2$ emissions.[1]

American Electric Power Service Corporation (AEP) submitted an application for its proposed Mountaineer CCS II Project in response to the CCPI Round 3 solicitation. As described in Section 1.6.4 and 2.2.2, DOE selected AEP's project and four other applications for possible funding pending further, more detailed consideration. The DOE determined that five projects would best meet CCPI's goals and objectives.

## 1.3 PROPOSED ACTION

### 1.3.1 Proposed Agency Action

DOE's Proposed Action is to provide financial assistance to AEP under the CCPI Program to support construction and operation of AEP's Mountaineer CCS II Project.[2] DOE proposes to provide AEP with up to $334 million of the project cost. This funding would constitute about 50 percent of the estimated total project cost during the 46-month demonstration period. The following provides a summary description of AEP's proposed project; please refer to Section 2.3 for more information.

The **Proposed Action** being considered by DOE is whether to provide cost-shared funding to the Mountaineer CCS II Project. This project includes capturing $CO_2$ from an existing power plant and injecting it into deep geologic formations for permanent storage.

### 1.3.2 AEP's Proposed Project

AEP proposes to construct a commercial-scale CCS system at its Mountaineer Power Plant (a 1,300-megawatt [MW] coal plant) and other AEP-owned properties located near New Haven, West Virginia. The project would capture $CO_2$ from this existing pulverized coal power plant, transport the captured $CO_2$

[1] As stated in the Financial Assistance FOA for Round 3, "DOE's specific objective is to demonstrate advanced coal-based technologies that capture and sequester, or put to beneficial use, $CO_2$ emissions. DOE's goals are to demonstrate at commercial scale in a commercial setting, technologies that (1) can achieve a minimum of 50 percent $CO_2$ capture efficiency and make progress toward a target $CO_2$ capture efficiency of 90 percent in a gas stream containing at least 10 percent $CO_2$ by volume, (2) make progress toward capture and sequestration goal of less than 10 percent increase in the cost of electricity for gasification systems and less than 35 percent for combustion and oxycombustion systems all as compared to current (2008) practice, and (3) capture and sequester or put to beneficial use a minimum of 300,000 tons per year of $CO_2$ emissions using a 30-day running average to determine if the project successfully meets the $CO_2$ capture efficiency and the capture and sequestration or beneficial use rate requirements of this Announcement" (NETL, 2009).

[2] Throughout this EIS, the term "Mountaineer CCS II Project" is used to describe the entire AEP proposal, including proposed components of the project. These are briefly described in this section and in more detail in Chapter 2.

by pipeline to well locations, and inject it into saline formations approximately 1.5 miles (7,920 feet) below the earth's surface for permanent geologic storage.

As part of the project, AEP would construct a $CO_2$ capture facility using Alstom's chilled ammonia process (CAP) at the Mountaineer Plant. Alstom's CAP is a proprietary process for removing $CO_2$ from combustion flue gas. The capture facility would be located within the boundaries of the Mountaineer Plant and would occupy approximately 11.5 acres (i.e., 500 feet by 1,000 feet). The capture facility would process a slipstream of the Mountaineer Plant's flue gas, equivalent in quantity to the flue gas emissions from a 235-MW power plant. Each year, approximately 1.5 million metric tons of $CO_2$ would be captured, treated, and compressed into a highly concentrated form suitable for geologic storage. The processed $CO_2$ would be transported by pipeline (primarily underground) to injection wells on AEP properties. These properties are located within approximately 12 miles of the Mountaineer Plant in Mason County, West Virginia. The captured $CO_2$ would be injected into deep saline formations for permanent storage.

Consistent with DOE's objectives under CCPI Round 3, the Mountaineer CCS II Project would be designed to

- remove approximately 90 percent of the $CO_2$ from the 235-MW slipstream;
- demonstrate a commercial-scale deployment of the CAP for $CO_2$ capture; and
- demonstrate the injection, permanent geologic storage, and monitoring of $CO_2$ in deep underground saline formations.

Existing infrastructure (e.g., roadways, utilities) would be used to the extent possible. However, upgrades to, and construction of, additional infrastructure may be required. Major new equipment would include absorbers, regenerators, strippers, pumps, heat exchangers, compressors, and a refrigeration system. In addition, the system would include reagent and refrigerant unloading equipment, water-handling equipment, a control room, maintenance and administrative facilities, and a laboratory, all of which would be located at the Mountaineer Plant. Carbon dioxide injection wells and pipelines would be located along existing rights-of-way (ROW) to the extent possible and on other AEP properties in the area.

## 1.4 PURPOSE AND NEED FOR AGENCY ACTION

The *purpose* of DOE's Proposed Action under the CCPI Program is to demonstrate advanced coal-based technologies at a commercial scale that capture and geologically sequester $CO_2$ emissions.

**The purpose of and need for DOE action** is to advance the CCPI Program by funding projects with the best chance of achieving the program's objectives as established by Congress: commercialization of clean coal technologies that advance efficiency, environmental performance, and cost competitiveness well beyond the level of technologies currently in commercial use.

The principal *need* addressed by DOE's Proposed Action is to satisfy the responsibility Congress imposed on DOE to demonstrate advanced coal-based technologies that can generate clean, reliable, and affordable electricity in the U.S. The CCPI Program selects projects with the best chance of achieving the program's objectives as established by Congress: commercialization of clean coal technologies that advance efficiency, environmental performance, and cost competitiveness well beyond the level of technologies currently in commercial service.

This proposed project would help DOE, through the CCPI Program, meet its congressionally mandated mission to support advanced clean-coal technology projects. This specifically includes those projects that have progressed beyond the research and development stage to a point of readiness for operation at a scale that, once demonstrated, can be readily implemented across the commercial sector. Post-combustion $CO_2$ capture offers the greatest near-term potential for reducing power sector $CO_2$ emissions because it can be used to retrofit existing coal-based power plants and can also be tuned for various levels

of $CO_2$ capture, which may accelerate market acceptance (NETL, 2010a). A successful demonstration of Alstom's CAP at the Mountaineer Plant would generate technical, environmental, and financial data from the design, construction, and operation of the facility. These data would confirm that the deployed technologies can be effectively and economically implemented at a commercial scale. Furthermore, the cost-shared financial assistance from DOE would reduce the risk to AEP in demonstrating this technology.

## 1.5 NATIONAL ENVIRONMENTAL POLICY ACT

### 1.5.1 DOE Responsibilities

NEPA requires all federal agencies to include, in every recommendation or report on proposals for major federal actions that may significantly affect the quality of the human environment, a detailed statement by the responsible agency describing: (1) the potential environmental impacts of the Proposed Action; (2) any adverse environmental effects that cannot be avoided should the proposal be implemented; (3) alternatives to the Proposed Action, including the alternative of taking no action; (4) the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity; and (5) any irreversible and irretrievable commitments of resources that would be involved in the Proposed Action should it be implemented. NEPA also requires consultations with agencies that have jurisdiction or special expertise with respect to any environmental impact involved, and that the detailed statement along with the comments and views of consulted governmental agencies be made available to the public (42 USC 4332).

DOE developed a two-phased review process to comply with NEPA for the CCPI Program. During the first phase of the process, DOE announced the open solicitation which initiated a competitive selection process to obtain a set of projects meeting the needs of the CCPI Program. Applications received in response to the solicitation were screened for compliance with the basic eligibility requirements set forth in the announcement. Evaluation of the applications focused on the technical description of the proposed project, financial plans and budgets, potential environmental impacts, and other information that the applicants were requested to submit. To aid in the environmental evaluation, the applicants provided information on the site-specific environmental, health, safety, and socioeconomic aspects of their project. DOE documented the potential environmental consequences for each application in an environmental critique that was presented to the merit review board. The results are summarized in a publicly available environmental synopsis (see Appendix A), prepared in accordance with DOE's NEPA implementing regulations.

Following separate reviews by technical, environmental, and financial panels, and a comprehensive assessment by a merit review board, DOE officials selected projects for potential funding. By broadly soliciting proposals to meet the programmatic purposes and needs for DOE action and by evaluating the potential environmental impacts associated with each proposal before selecting projects that would go forward, DOE considered a reasonable range of alternatives for implementing CCPI.

In the second phase of the NEPA process, DOE determined that providing financial assistance for the construction and operation of the Mountaineer CCS II Project would constitute a major federal action that could significantly affect the quality of the human environment. DOE prepared this EIS to inform its decision-making with respect to providing financial assistance to AEP for support of the Mountaineer CCS II Project. DOE used information provided by AEP and other project team members for the proposed project, as well as information provided by state and federal government agencies, and subject-matter experts. DOE prepared this EIS in accordance with Section 102(2)(C) of NEPA, as implemented under regulations promulgated by CEQ (40 CFR 1500 through 1508), and DOE's NEPA implementing procedures (10 CFR 1021). DOE's NEPA regulations (10 CFR 102.216) establish a specific procedure for reviewing projects seeking financial assistance prior to DOE deciding which ones to select. This EIS is organized according to CEQ recommendations (40 CFR 1502.10).

Figure 1-1 illustrates the steps involved in the EIS process. To formally initiate the NEPA process, DOE published a Notice of Intent (NOI) to prepare an EIS in the *Federal Register (FR)* on June 7, 2010, under Docket ID No. FR Doc. 2010–13568 (75 FR 13568). After issuing the NOI, DOE conducted a thorough scoping process that included a public scoping meeting and consultation with various interested governmental agencies and stakeholders. Information related to the public scoping meeting is described in Appendix B, and consultation-related correspondence is provided in Appendix C. The results of the scoping efforts were used by DOE to define the scope and areas of emphasis (or focus) of this EIS.

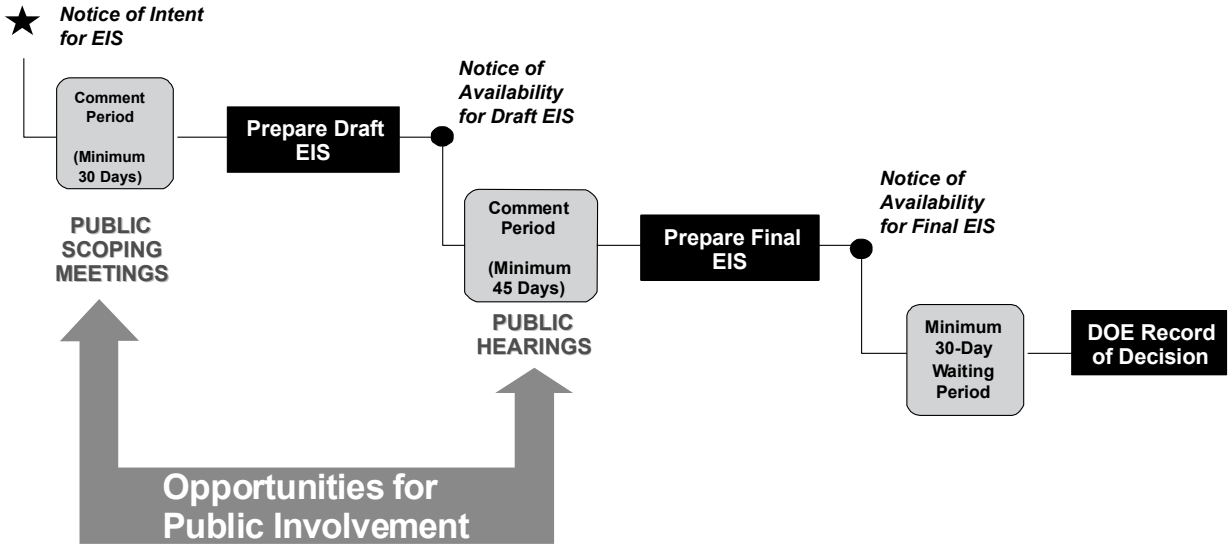


**Figure 1-1. Steps in the NEPA Process**

DOE has distributed the Draft EIS to interested parties and published a Notice of Availability (NOA) in the *Federal Register*. A separate NOA was published by the EPA. Beginning with publication of the NOA, DOE established a 45-day public review and comment period on the Draft EIS. During this period, DOE plans to hold a public hearing in the New Haven area to solicit public comments on the Draft EIS. DOE will consider and respond to all substantive comments received on the Draft EIS, both individually and collectively. DOE will address those comments in a Final EIS that will be distributed to the public and other stakeholders. Upon DOE's publication and distribution of the Final EIS, the EPA will publish an NOA in the *Federal Register*, at which point DOE will observe a minimum 30-day waiting period before issuing an agency decision. Upon completion of the waiting period, DOE will publish a Record of Decision (ROD) in the *Federal Register* stating the agency's decision whether to provide financial assistance for the AEP Mountaineer CCS II Project and documenting any special requirements and mitigation measures, if necessary.

### 1.5.2 Cooperating Agencies

A federal, state, tribal, or local agency having special expertise with respect to an environmental issue or jurisdiction by law may be a cooperating agency in the NEPA process. A cooperating agency has the responsibility to assist the lead agency by: (1) participating in the NEPA process at the earliest possible time; (2) participating in the scoping process; (3) developing information and preparing environmental analyses, including portions of the EIS for which the cooperating agency has special expertise; and (4) making staff support available at the lead agency's request to enhance the lead agency's interdisciplinary capabilities.

No cooperating agencies have been identified at this time.

## 1.6 SCOPE OF THE ENVIRONMENTAL IMPACT STATEMENT

### 1.6.1 NEPA Scoping Process

This EIS assesses the potential environmental impacts of the Proposed Action and the No Action Alternative. DOE determined the scope of this EIS based on internal planning and analysis, consultation with federal and state agencies, and involvement of the public.

During the public scoping period, DOE solicited public input to ensure that: (1) significant issues were identified early and properly analyzed; (2) issues of minimal significance would not consume excessive time and effort; and (3) the EIS would be thorough and balanced, in accordance with applicable regulations and guidance (see Section 1.1).

DOE held a public scoping meeting on June 22, 2010 at the New Haven Elementary School in New Haven, West Virginia. DOE published notices in the following local newspapers announcing the meeting location and time: *The Daily Sentinel* and *The Point Pleasant Register* (June 8 and June 22), and the *Sunday Times Sentinel* (June 13 and June 20). DOE also announced the meeting in its NOI published in the *Federal Register* on June 7, 2010. This meeting was attended by seven members of the public, as well as project staff from DOE, AEP, and its other project partners.

The scoping meeting began with an informal open house from 5:00 p.m. to 7:00 p.m. During this time, attendees were able to view project-related posters, handouts, and video; and ask questions of DOE and AEP representatives. The informal open house was followed by a formal presentation and comment period, which were both transcribed by a court reporter. The public scoping period ended on July 9, 2010 after a 30-day comment period. During the comment period, DOE accepted comments by telephone, facsimile, U.S. mail, and electronic mail. Appendix B provides additional information on the NEPA public scoping process for this project.

### 1.6.2 Issues Identified Prior to the Scoping Process

DOE initially identified the following environmental resource areas for consideration in the EIS. These resource areas were identified in early planning efforts and listed in the NOI. This list was neither intended to be all-inclusive, nor a predetermined set of resources to be assessed for potential environmental impacts:

- Air quality resources
- Water resources
- Infrastructure and land use
- Visual resources
- Solid wastes
- Ecological resources, including threatened and endangered species and species of special concern
- Floodplains and wetlands
- Traffic
- Historic and cultural resources, including historic structures and properties, sites of religious and cultural significance to tribes, and archaeological resources
- Geology
- Health and safety
- Noise
- Socioeconomics, including impacts to community services and Environmental Justice

### 1.6.3 Comments Received and Issues Identified During the Scoping Period

DOE received two scoping comments at the scoping meeting. One commenter spoke at the public scoping meeting during the formal comment period. Although this commenter did not have a specific comment about the scope of the project, he spoke about the history of the AEP Mountaineer Power Plant, development and deployment of air emission control technologies, and his hope that the Mountaineer CCS II Project would be successful. One local landowner spoke with a DOE representative at the public scoping meeting, but did not wish to comment during the formal comment period or submit her comment in writing. This individual owns property adjacent to the northern boundary of AEP's property. Although the property is serviced by city water, there was concern about potential impacts to drinking water wells as a result of leaks of $CO_2$. DOE received no other comments during the 30-day scoping period. Three people submitted requests to receive a copy of the Draft EIS and/or the Final EIS or Summary.

Although most of the resource areas initially identified by DOE received little or no attention from the public during the scoping period, the EIS nevertheless addresses potential impacts to the areas identified during both internal planning and public scoping for the proposed project.

### 1.6.4 Agency Decision-Making Process

DOE's alternatives to its Proposed Action for CCPI - Round 3 consist of the other technically acceptable applications received in response to the FOA. DOE received 36 applications that met the minimum eligibility requirements. These applications provided DOE with a range of options for meeting the objectives of Round 3 of the CCPI. DOE screened each of these 36 applications to evaluate potential environmental consequences of each application during DOE's initial review and made preliminary determinations regarding the level of NEPA review required.

DOE documented the potential environmental consequences for each application in an environmental critique and summarized the results in a publicly available environmental synopsis (see Appendix A). DOE prepared this synopsis in accordance with DOE's NEPA implementing regulations, as found in 10 CFR 1021.216(h). Through this review process, DOE considered both potential environmental consequences and the ability of each application to meet the purpose of and need for action. DOE uses the procedures established in its NEPA regulations, specifically those in 10 CFR 1021.216, to identify and consider the potential environmental impacts of the eligible projects in making its selections as described in Section 1.5.1. The preliminary NEPA determinations and environmental reviews were provided to the selecting official for consideration during the selection process.

Ultimately, DOE determined that the proposed Mountaineer CCS II Project and four other applications would best meet the goals and objectives of the CCPI Program. The proposed projects from these five applications must each complete a separate, independent, project-specific (and more detailed) NEPA analysis that would each be expected to result in separate RODs. Although these five projects are eligible for cost-shared funding under CCPI, there is no other relationship among them. The selection and potential execution of each stand-alone project has no effect or bearing on the other projects.

This EIS identifies and analyzes the potential impacts of the Mountaineer CCS II Project at the proposed locations near New Haven, West Virginia (please see Chapter 3). No alternative CCS sites are being analyzed in this EIS, as DOE's pending decision is related to providing AEP with financial assistance based on the project attributes as described in AEP's Round 3 CCPI application. However, this EIS analyzes AEP's siting options for various components of the Mountaineer CCS II Project (e.g., injection well sites, $CO_2$ pipeline corridors, etc.). Chapter 2 discusses all of the aspects of the project in detail.

Evaluations of potential impacts included in this EIS are intended to assist the federal decision-makers in deciding whether to provide CCPI cost-shared funding to AEP for the Mountaineer CCS II Project. If DOE decides to provide financial assistance for the project, DOE may also specify measures to mitigate potential impacts. AEP would be required to implement the measures identified through the NEPA

process in order to continue receiving DOE funds for the project. In the absence of DOE cost-shared funding (the No Action Alternative), AEP might elect to construct and operate the Mountaineer CCS II Project using alternative funding mechanisms. However, for purposes of analysis in this EIS, the No Action Alternative is defined as a "no-build" scenario under which it is assumed that the project would not be constructed in the absence of DOE funding (see Section 2.2.2.1).

No sooner than 30 days after publication of EPA's NOA of the Final EIS in the *Federal Register*, DOE will announce in a ROD the selection of either the Proposed Action or the No Action Alternative. Should the Proposed Action be selected in the ROD, AEP would make the additional engineering design decisions to ensure compliance with any required conditions contained in the ROD.