

## **Project Cypress Direct Air Capture Hub**

### **Proposed Action**

The Infrastructure and Investment in Jobs Act, commonly known as the Bipartisan Infrastructure Law (BIL), established the Regional Direct Air Capture Hubs program to accelerate commercialization of, and demonstrate the processing, delivery, secure geologic storage, and/or conversion of, carbon dioxide (CO<sub>2</sub>) captured from the atmosphere. The United States Department of Energy (DOE) competitively selected Battelle Memorial Institute (Battelle), with project partners Climeworks Corporation (Climeworks) and Heirloom Carbon Technologies (Heirloom), to demonstrate Project Cypress under the Regional Direct Air Capture Hubs Funding Opportunity Announcement (DE-FOA-0002735).

DOE's Office of Clean Energy Demonstration (OCED) is proposing to provide funding for portions of the Project Cypress Direct Air Capture Hub (Project Cypress). OCED's decision whether and how to provide federal funding in support of Project Cypress is a major federal action subject to review under the National Environment Policy Act (NEPA). Pursuant to NEPA, the Council on Environmental Quality (CEQ) NEPA regulations, and the DOE NEPA implementing procedures, OCED is preparing an environmental impact statement (DOE/EIS-0567) to evaluate the potential impacts to the human environment associated with Project Cypress.

### **Project Description**

Project Cypress would demonstrate the processing, delivery, secure geologic storage, and/or conversion of, CO<sub>2</sub> captured from the atmosphere through the utilization of contrasting Direct Air Capture (DAC) technologies developed independently by Climeworks and Heirloom. Project Cypress would be comprised of Cypress Southwest, demonstrating Climeworks' DAC technology, and Cypress Northwest, demonstrating Heirloom's DAC technology. Cypress Southwest would be located in Calcasieu Parish, LA. Cypress Northwest would be located in Caddo Parish, LA, as described below.

Separate from DOE's proposed funding action, Project Cypress has selected CapturePoint Solutions, LLC (CPS) to deliver CO<sub>2</sub> to independent CO<sub>2</sub> lateral pipelines to the southwest and northwest. CPS would solicit permits, construct, and operate the pipeline infrastructure that would connect Cypress Southwest and Cypress Northwest to an existing common carrier CO<sub>2</sub> pipeline network and ultimately to the contracted Class VI CO<sub>2</sub> sequestration well for permanent geologic storage of the removed CO<sub>2</sub>.

## **Cypress Southwest - Climeworks**

Climeworks' Generation 3 (Gen 3) DAC technology is comprised of modular CO<sub>2</sub> collector containers that when combined form a single capture unit (cube design). The Climeworks DAC technology removes CO<sub>2</sub> from the air through the following steps: 1) air is drawn into the collector containers by an assembly of vertical fans affixed to the top of each capture unit and CO<sub>2</sub> is captured on the surface of a highly selective filter material through the adsorption process; 2) when the filter is full of CO<sub>2</sub>, the vertical sliding door attaches to the collector container creating an air-tight seal (e.g., closing the collector container), and the container is heated to release the CO<sub>2</sub> from the filter through the desorption process; 3) extracted CO<sub>2</sub> is processed to remove impurities and water; 4) captured CO<sub>2</sub> is then transported via pressurized CO<sub>2</sub> pipeline; 5) the process is repeated. Collector containers would be arranged (stacked) in a 4:1 ratio with a vertical sliding door system. Each cube or capture unit includes four collector containers always undergoing adsorption, and one collector container undergoing desorption.

Climeworks would demonstrate Gen 3 DAC technology at Cypress Southwest, which would consist of an approximately 300-KTA Climeworks DAC facility (Stage 1) and an approximately 1000-KTA Climeworks DAC facility (Stage 2) located in Calcasieu Parish, LA.

Cypress Southwest would require power provided by Entergy Corporation (Entergy), potable water and sewer provided by the local municipality, and transport and secure geologic storage of CO<sub>2</sub> provided by CPS. Note that DOE would not provide funding for these activities, nor are they within the jurisdiction of DOE.

## **Cypress Northwest - Heirloom**

Heirloom's DAC technology uses calcium bearing mineral (limestone) to capture CO<sub>2</sub> directly from the air using a four-step cyclic process. Using a renewable energy-powered kiln, Heirloom's DAC process heats crushed calcium carbonate or limestone until CO<sub>2</sub> can be extracted and transported for permanent sequestration offsite in a contracted Class IV Well. The by-product of this process is calcium oxide, which is then hydrated with water to form calcium hydroxide (Ca (OH)<sub>2</sub>). Calcium hydroxide is spread onto trays stacked in a climate-controlled storage facility to absorb CO<sub>2</sub> from the air for up to 3 days. This process converts the calcium hydroxide back to limestone and the cycle begins again.

Heirloom would demonstrate their DAC technology at Cypress Northwest, which would consist of an approximately 100-KTA Heirloom DAC facility located in Caddo Parish, LA.

Cypress Northwest would require power provided by Southwestern Electric Power Company, an American Electric Power Company, connection to local water and sewer via the Port of Caddo-Bossier, and transport and secure geologic storage of CO<sub>2</sub> provided by

CPS. Note that DOE would not provide funding for these activities, nor are they within the jurisdiction of DOE.

### **Environmental Impact Statement (EIS)**

OCED anticipates that the EIS would evaluate the potential direct, indirect, and cumulative impacts during construction, operation, and decommissioning related to the following resource areas: land use, atmospheric conditions and air quality, hydrologic conditions and water quality, geology and soils, vegetation and wildlife, socioeconomic conditions, environmental justice, cultural resources, visual resources, health and safety, and cumulative impacts. This list is not intended to be all-inclusive or to imply a predetermination of potential impacts.