

THE OFFICE OF CLEAN ENERGY DEMONSTRATIONS



Carbon Capture Pilot at Cane Run Generating Station: Community Briefing February 21, 2024

Office of Clean Energy Demonstrations

U.S. Department of Energy

Welcome & Meeting Objectives

- The Office of Clean Energy Demonstrations (OCED) at DOE recently announced the selection of four Carbon Capture Large-Scale Pilot Projects, including one in Louisville, Kentucky.
- We at DOE want to share more information on this project and the opportunities to plug in and help shape your community's energy future.
- Engage with DOE and the partners involved in this project.



Briefing Logistics

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Is this briefing being recorded?

No, this briefing is not being recorded in order to encourage open dialogue and participation from all attendees.

Will the slides be shared?

Yes, a copy of the presentation slides will be shared via email with registrants and on the OCED website within the next few days.



- Welcome & Objectives
- OCED Overview
- Carbon Capture Large-Scale Pilot Projects
 Program Overview
- Carbon Capture Pilot at Cane Run Generating Station Overview
- Next Steps & Resources
- Feedback Session
- Wrap-up & Close



Agenda

OCED Overview



John Brown, Stakeholder Engagement Lead, Carbon Capture, OCED

OCED Mission

Deliver clean energy technology demonstration projects at scale in partnership with the private sector to accelerate deployment, market adoption, and the equitable transition to a decarbonized energy system.



Prioritizing Community Benefits in OCED Projects

OCED **requires** applicants to include a Community Benefits Plan to help ensure broadly shared prosperity in the clean energy transition.

By prioritizing community benefits,

we can ensure the next chapter in America's energy story is marked by greater justice, equity, security, and resilience.

Community & Labor Engagement

Diversity, Equity, Inclusion, & Accessibility

Investing in the American Workforce



Justice40 Initiative



Carbon Capture Large-Scale Pilot Projects



Todd Shrader, Deputy Director, Project Management, OCED

How Does Carbon Capture, Utilization, and Storage Work?





Deploying Carbon Capture Technology has the Potential to...



Reduce harmful carbon

pollution by preventing carbon emissions from entering the atmosphere.





Decarbonize existing infrastructure and assets in the power and industrial sectors.



Demonstrate technology

leadership and increase U.S. competitiveness in the global energy transition.

Maintain good, high-wage jobs while advancing the clean energy economy.



Support our nation's netzero goals and help the world decarbonize at existing facilities.





Carbon Capture Large-Scale Pilot Projects Program



Establish and test innovative carbon capture pilot projects large enough to support new processes and technology improvements at scale.

Carbon Capture Pilots Current Status

- February 2023: Announced funding opportunity for Carbon Capture Large-Scale Pilot Projects.
- May 2023: Responded to concept papers.
- July 2023: Received full applications.
- February 2, 2024: OCED announced four projects selected for award negotiation.
- DOE is considering another FOA for more Carbon Capture Large-Scale Pilot Projects.

Selected Carbon Capture Large-Scale Pilot Projects



Carbon Capture Pilot at Cane Run Generating Station Overview



Carbon Capture Pilot at Cane Run Generating Station

PPL Corporation Research & Development February 2024

Strong Research Partnership



Together we plan to develop and deploy a 20 MW carbon capture pilot unit, benefit the community, and utilize the captured carbon dioxide.



About Cane Run Natural Gas Combined-Cycle Plant



PPL's newest plant with a history of pioneering environmental technology.

- Newest, most-efficient, least-cost power plant
- Union plant represented by IBEW Local 2100
- 640 megawatts of natural gas capacity
 - 2 Gas turbines x 1 steam turbine
 - Siemens gas turbines
 - **Vogt** Heat Recovery Steam Generator (HRSG)
- Leader in emissions reduction technology with one of the first desulphurization systems in the U.S. in 1972.
- Visit from President Jimmy Carter in 1979 to see stateof-the-art emissions control systems at former Cane Run coal-fired plant.



20-Megawatt Large Carbon Capture Pilot Unit

A \$72 million award to build a carbon capture unit at a natural gas combined-cycle plant.

- Scale: A 20 MWe slipstream of flue gas, ~200+ tons CO₂ per day
- Final product is 99.9% purity carbon dioxide
- Could reduce Cane Run CO₂ emissions by 3-4%
- 100% beneficial reuse of the captured carbon dioxide
- Final product will be food-grade quality
- **Technology:** Amine-based post-combustion carbon dioxide capture system with 95% capture, developed with the University of Kentucky.
- Solvent independent and low cost
- **Research:** Focused on lowering technology risk and developing the carbon capture process for commercialization.
- Expected Timeline: 2024-2030







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Community Benefits Plan (CBP) Overview

The iterative CBP process will be updated with community feedback.

Community and Labor Engagement

- Engage local Jefferson County Public Schools (e.g. teacher tours)
- Leverage communication channels (e.g. Neighbor to Neighbor
 Publication has highlighted carbon capture for the past 2 years.)

Workforce Development

- Significant number of workers are represented by IBEW Local 2100.
- We plan to expand educational opportunities, amplify training and increase STEM internship and co-op programs.

Diversity, Equity, Inclusion, & Accessibility

- Build on existing relationships with local Minority Serving Institutions (MSIs), including Kentucky State University.
- We are dedicated to developing a baseline of workforce diversity, vendor diversity, and regional demographics of the communities we serve while providing high quality jobs.

Justice40

The team will measure and communicate the potential economic benefits, environmental impacts, and increased utility resilience to frontline communities.





Thank you!

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Appendix

Kentucky Carbon Capture Historical Timeline

The team has worked together on carbon capture since 2006.

- 2006: Founded carbon capture program at University of Kentucky
- 2007: Member of EPRI Carbon Capture Program (P222)
- 2007: Built carbon capture Unit (0.1 MW) at University of Kentucky
- 2008: Founding member of Carbon Management Resource Group (CMRG)
- 2009: Kentucky drilled two test sequestration wells at 3,500 and 8,100 ft.
- 2014: Built operational CCS Pilot (0.7 MW or 15 ton/day) at E.W. Brown
- 2020: Founding member for EPRI Low Carbon Resource Initiative (LCRI)
- 2021: Net-negative natural gas carbon capture (DE-FE0032134)
- 2022: Full scale 640 MWe DOE FEED study at Cane Run (DE-FE0032223)
- **2023**: Direct air capture with hydrogen production (DE-FE0032255)
- 2023: Member of Appalachia Direct Air Capture Hub (DE-FE0032387)
- 2024: Carbon capture large pilot at Cane Run (Award Announced Feb. 2)





Next Steps & Resources



John Brown, Stakeholder Engagement Lead, Carbon Capture, OCED

Next Steps – Negotiations

Award Negotiations: DOE OCED will begin the negotiations process with project selectees

After Award: *IF the projects receive an award* (successful negotiations)

- Awarded projects will enter into a cooperative agreement with OCED
- Phase 1: Detailed Project Planning begins
- OCED will work with the awarded project partners starting in Phase 1 to ensure compliance with the National Environmental Policy Act (NEPA)
- Local communities (state, local and community stakeholders) will have the opportunity for ongoing engagement with OCED and the awardee(s)

More broadly, DOE is exploring the use of regional frameworks to support project outcomes.









Go/No-Go Decisions

Carbon Capture Large-Scale Pilot Projects Resources

Carbon Capture Large-Scale Pilot Projects Program

- Program Page
- Press Release
- Overview of Selected Projects
- Local Engagement Opportunities

Community Benefits

- <u>CBP101 Webinar</u>
- OCED CBP Factsheet
- OCED Communities, Jobs, and Justice
 Page

Additional Carbon Capture Resources

- <u>Carbon Management Pathways to</u> <u>Commercial Liftoff Report</u>
- Industrial Decarbonization Pathways to <u>Commercial Liftoff Reports</u>
- Interactive Diagram of DOE's Carbon
 Management Provisions



Feedback Session



Emmanuel Taylor, Facilitator

Ground Rules for Discussion

- Submit questions using the Q&A feature.
 - You can also see and upvote other questions that have been asked.
- Reserve judgement
- One idea at a time
- It is okay to build on the ideas of others
- Clarifying questions are okay





Stay Connected



 Reach DOE OCED about this project at CaneRun_CCPilot@hq.doe.gov

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