Department of Energy

Secretary Perry Announces $24 Million in New Projects to Advance Transformational Carbon Capture Technologies

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WASHINGTON, D.C. – Today, U.S. Secretary of Energy Rick Perry announced the selection of eight projects to receive nearly $24 million in federal funds for cost-shared research and development (R&D) for *Novel and Enabling Carbon Capture Transformational Technologies.* The selected projects will focus on the development of solvent, sorbent, and membrane technologies to address scientific challenges and knowledge gaps associated with reducing the cost of carbon capture. Secretary Perry announced these projects today at a joint press conference with International Energy Agency Executive Director, Dr. Fatih Birol.

"By 2040 the world will still rely on fossil fuels for 77% of its energy use. Our goal is to produce them in a cleaner way," said U.S. Secretary of Energy Rick Perry. "These projects will allow America, and the world for that matter, to use both coal and natural gas with near-zero emissions."

These transformational carbon capture projects are funded by the Office of Fossil Energy's (FE's) Carbon Capture Program. The National Energy Technology Laboratory will manage the projects, which are described below:

1. ***Advanced Structured Adsorbent Architectures for Transformative CO_2 Capture Performance* – Electricore, Inc. (Valencia, CA) intends to develop an optimized, commercially feasible carbon dioxide (CO_2) capture technology architecture in collaboration with Inventys, DNV GL USA, and Susteon. The process includes a dual-adsorbent bi-layer structured adsorbent design with a thermal conductive matrix that will enable a rapid temperature swing 40 to 100 times faster than a conventional thermal swing process. In-house bench-scale testing will be conducted on simulated flue gas and actual flue gas from a gas-fired boiler.**

   DOE Funding: $3,000,000; Non-DOE Funding: $774,630; Total Value: $3,774,630

2. ***Transformational Sorbent-Based Process for a Substantial Reduction in the Cost of CO_2 Capture* – InnoSepra, Inc. (Middlesex, NJ) plans to demonstrate a carbon capture process that uses physical sorbents featuring low heats of sorption in collaboration with Arizona State University, Mainline Engineering, Process Plant Equipment, and the Technology Centre Mongstad (TCM). This process will allow heat extraction to occur at lower temperatures than with solvent-based processes, which is expected to reduce capital costs and parasitic power loss. Testing will be conducted with actual flue gas at TCM.**

   DOE Funding: $3,000,000; Non-DOE Funding: $860,000; Total Value: $3,860,000

3. ***Validation of Transformational CO_2 Capture Solvent Technology with Revolutionary Stability* – ION Engineering, LLC (Boulder, CO) intends to conduct a comprehensive bench-scale test campaign in collaboration with Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO), Optimized Gas Treating, Sargent & Lundy, Hellman and Associates, and the National Carbon Capture Center (NCCC) to test their novel solvent. The project aims to further understand the key performance indicators of their novel solvent technology and validate the solvent performance at 0.6 MWe. Testing will be conducted at the NCCC utilizing U.S. coal-fired flue gas and will also validate a unique process simulation model for plant design.**

   DOE Funding: $2,999,998; Non-DOE Funding: $750,000; Total Value: $3,749,998

4. *Novel Transformational Membranes and Process for CO_2 Capture from Flue Gas* – Ohio State University (Columbus, OH) plans to develop a cost-effective design and fabrication process for a spiral wound polymer membrane and its membrane modules that will demonstrate high reactivity with CO_2, high CO_2 permeance, and very high CO_2/N_2 selectivity. Researchers will optimize and scale up the membrane to a prototype size via continuous roll-to-roll fabrication and construct and test a bench skid for testing the integrated membrane process. These membranes will first undergo parametric testing with simulated flue gas in the skid and then with actual flue gas at the NCCC.

   DOE Funding: $2,999,988; Non-DOE Funding: $750,000; Total Value: $3,749,988

5. *Transformational Molecular Layer Deposition Tailor-Made Size-Sieving Sorbents for Post-Combustion CO_2 Capture* – Rensselaer Polytechnic Institute (Troy, NY) intends to develop a transformational sorbent integrated with a tailored pressure swing adsorption cycle schedule in collaboration with the University of South Carolina (USC), Gas Technology Institute, Trimeric Corporation (Trimeric), and the NCCC. This technology can be installed in new or retrofitted onto existing pulverized coal power plants at a lower cost for CO_2 capture. Testing will first be conducted with simulated flue gas at USC and then tested with actual flue gas at the NCCC.

   DOE Funding: $3,000,000; Non-DOE Funding: $759,206; Total Value: $3,759,206

6. *Rational Development of Novel Metal-Organic Polyhedra-Based Membranes for CO_2 Capture* – Research Foundation for SUNY on behalf of the University at Buffalo (Amherst, NY) plans to develop transformative mixed matrix membranes in collaboration with the California Institute of Technology, Membrane Technology and Research, Rensselaer Polytechnic Institute, Trimeric, and the NCCC. The membranes will contain advanced materials, such as metal organic polyhedras and rubbery polymers, to achieve high CO_2 permeance, high CO_2/N_2, and high CO_2/O_2 selectivity at temperatures up to 60 degrees Celsius. Testing will be conducted at the NCCC.

   DOE Funding: $2,857,577; Non-DOE Funding: $975,405; Total Value: $3,832,982

7. *Novel Next Generation Sorbent System for Post-Combustion CO_2 Capture* – TDA Research, Inc. (Wheat Ridge, CO) intends to develop a transformational sorbent system for a post-combustion CO_2 capture process in collaboration with the University of California at

Irvine, the University of Alberta, and the Wyoming Integrated Test Center. The technology features a high-capacity sorbent with a vacuum concentration swing adsorption process that enables use of a single-stage vacuum pump with a low auxiliary load. Testing will be conducted on actual flue gas at the Wyoming Integrated Test Center.

DOE Funding: $3,000,000; Non-DOE Funding: $750,000; Total Value: $3,750,000

8. ***Fog + Froth-Based Post-Combustion CO_2 Capture in Fossil-Fuel Power Plants* – University of Kentucky Research Foundation (Lexington, KY) plans to fabricate, integrate and research a compact absorber with integrated fog and froth formation zones. Testing will be conducted at the University of Kentucky's Center for Applied Energy Research bench post-combustion CO_2 capture facilities using both simulated and real coal-derived flue gas.**

   DOE Funding: $2,992,831; Non-DOE Funding: $748,350; Total Value: $3,741,181

The scope of these projects aligns with the scientific challenges and knowledge gaps identified in the DOE ministerial-level Mission Innovation report, *Accelerating Breakthrough Innovation in Carbon Capture, Utilization, and Storage*, which can be found here. These selected projects will join 11 other projects previously chosen by FE to receive approximately $28.9 million during the first closing of this FOA in fiscal year 2018.

More information about DOE's Office of Fossil Energy can be found HERE. More information about the National Energy Technology Laboratory is available HERE.

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