CURC CARBON UTILIZATION RESEARCH COUNCIL
ADVANCING FOSSIL ENERGY SOLUTIONS

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The Carbon Utilization Research Council (CURC) is focused on technology solutions for the responsible use of our fossil energy resources to support our nation's need for reliable and affordable energy. For more information, please visit our website at www.curc.net.

www.curc.net
1050 Thomas Jefferson St. NW
Washington, D.C. 20007

The CURC newsletter communicates the work we have collectively accomplished during in 2018 and provides a look forward to our efforts for the rest of the year.

CURC ACTIVITIES

CURC, EPRI, ClearPath Foundation Hold Congressional Briefing to Debut New Studies

At a July 25 briefing, CURC unveiled the findings of two reports – the *2018 CURC-EPRI Advanced Fossil Energy Technology Roadmap* and "*Making Carbon a Commodity: The Potential of Carbon Capture RD&D*" – and was pleased to be joined by Congressional staff, representatives from the Department of Energy (DOE), CURC members, and interested stakeholders.

This is the fifth Roadmap developed by CURC and the Electric Power Research Institute (EPRI) to define and update the research, development and demonstration (RD&D) of innovative technologies that will transform how we use our fossil energy resources for power generation. If implemented, the Roadmap identifies technologies that can be available in the 2025-2035 timeframe that generate electricity from fossil fuels with significantly reduced emissions and can be cost competitive with other sources of electricity generation. The 2018 CURC-EPRI Roadmap findings were used to inform CURC's testimony to the House and Senate Appropriations Committees on the FY 2019 Budget for DOE and were incorporated into bills introduced in the House and Senate to authorize a new Fossil Energy research, development and design program at DOE (more below).

Making Carbon a Commodity examines the potential for market-driven deployment of carbon capture, utilization and storage (CCUS) in coal and natural gas power generation. The study examined how reducing the cost of carbon capture via a rigorous RD&D program identified in the Roadmap can enable new coal and natural gas power projects with carbon capture for enhanced oil recovery (EOR), and quantifies the resulting economic and employment benefits to the United States. The study projects up to 87 GW of CCUS for EOR by 2040, resulting in a significant increase in domestic oil production and lower cost retail electricity rates, all of which contribute to increases in annual GDP and over 800,000 new jobs through 2040. CURC, ClearPath Foundation, Advanced Resources International (ARI), NERA Economic Consulting, and L.D. Carter contributed to the analysis.

CURC STAFF

Shannon Angielski
Executive Director
sma@vnf.com

Michael Weiner
Director of Coalition Services
mrw@vnf.com

Michael Platner
Tax Policy Specialist
mlp@vnf.com

Sofia Baneth
CURC Administrator
sbaneth@vnf.com

UPCOMING EVENTS

Showcasing Advancements in Fossil Energy Technology Development
October 3, 2018
Washington, D.C.

CURC Capitol Hill Day 2018

In February, CURC held its annual Capitol Hill Day in Washington, D.C. We were joined by Assistant Secretary for Fossil Energy Steve Winberg as well as Senator Heidi Heitkamp (D-ND) who addressed our membership as we prepared for the event.

On February 28, CURC members met with 42 Congressional offices, including Members and staff from both the House and Senate. CURC's message on the Hill focused on:

Senator Heidi Heitkamp addressing the CURC General membership Meeting in Washington, D.C.

- Providing robust funding to the DOE Fossil Energy Research and Development Program for Fiscal Years 2018 and 2019;
- Supporting legislation that would make technical corrections to the Section 48A coal with carbon capture investment tax credit;
- Introducing legislation to authorize a new Fossil Energy RD&D program based on the CURC-EPRI Roadmap technology pathways; and
- Enabling the development of new CCUS fossil energy projects in any energy or infrastructure legislative proposals.

We would like to thank all CURC members that were able to join us in Washington for what was a very successful two days on Capitol Hill!

CURC-NETL-DOE Annual Program Workshop

On April 17-18, CURC held the 2018 CURC-NETL DOE Annual Program Workshop in Pittsburgh, PA.

We were pleased to be joined by DOE Assistant Secretary for Fossil Energy Steve Winberg, as well as representatives from DOE headquarters and the National Energy Technology Laboratory in Pittsburgh, to discuss the Department's Fossil Energy program.

Presentations from the Workshop are available on our website at www.curc.net in the Members-Only section.

CURC SPEAKING ENGAGEMENTS

Southern States Energy Board Winter Meeting
Washington, D.C.
February 26, 2018

World Coal Association Briefing: Delivering Low Emission Coal
Washington, D.C.
May 16, 2018

Southern States Energy Board: Federal Outlook for Coal
Kingsport, TN
May 21, 2018

Keystone Board Meeting: Role of Fossil Fuels in the Resource Mix of the Future
Washington, D.C.
June 5, 2018

CEATI International Webinar: 45Q Tax Credits
June 20, 2018

House Space, Science and Technology Subcommittee Hearing
Washington, D.C.
July 18, 2018

CURC-EPRI-ClearPath Congressional Briefing
Washington, D.C.
July 25, 2018

THANK YOU TO OUR 2018 MEETING SPONSORS

UPCOMING CURC EVENTS

CURC Advanced Fossil Energy Technology Showcase

On October 3, CURC will hold its biennial Advanced Fossil Energy Technology Showcase in Washington, D.C. on Capitol Hill. The Showcase provides an opportunity to learn from innovators about novel technologies they are developing to convert fossil fuels to low carbon energy. The event provides an opportunity to interact with and hear from industry and public sector experts, stakeholders and policymakers. Past special guest speakers have included the Secretary of Energy, Assistant Secretaries of Fossil Energy, the Program Director of ARPA-E, Members of Congress, International Energy Agency representatives, and leading technology and project exhibitors from across the country.

The Showcase will include an exhibit area for technology companies to display their work. There will be keynote speaker sessions and targeted panel discussions to address technology and other policy-related efforts to advance fossil energy technologies. There will also be networking opportunities throughout event. If you are interesting in exhibiting at the 2018 Showcase, please contact Michael Weiner. There is no fee to be an exhibitor. Sponsorship opportunities are also available.

FEDERAL ADVOCACY

Section 45Q Tax Credit Reform Enacted in Bipartisan Budget Act

CURC is pleased to report that S. 1535, the Furthering carbon capture,

UPCOMING EVENTS

NETL CO_2 Capture Technology Project Review
Pittsburgh, PA
August 13, 2018

Carbon Capture Technology Development Forum
Birmingham, AL
September 19, 2018

Utilization, Technology, Underground storage, and Reduced Emissions (FUTURE) Act, which extends and expands the Section 45Q carbon sequestration tax credits, was included in the Bipartisan Budget Act of 2018 passed by Congress in February. Nearly a decade ago, CURC was among the primary advocates and supporters of the original 45Q carbon sequestration tax credit enacted by Congress in 2008 and has since worked to strengthen and extend the credit.

CURC worked closely with Senators Heidi Heitkamp (D-ND), Shelley Moore Capito (R-WV), Sheldon Whitehouse (D-RI) and John Barrasso (R-WY) in this effort, and thanks them for their leadership and fortitude in passing the FUTURE Act. The support of CURC's members was critical as this group of Senators sought to build an unprecedented bipartisan coalition to advance the legislation. CURC also applauds the leadership of Congressman Mike Conaway (R-TX), who introduced similar legislation in the House of Representatives, H.R. 3761, the "Carbon Capture Act", and Congressman David McKinley (R-WV), Chairman of the House Coal Caucus, for their leadership in gathering bipartisan support for Section 45Q reform in the House.

CURC is now undertaking an effort to identify and inform the IRS of solutions issues that need to be addressed to implement the 45Q tax credit program through IRS guidance or rulemaking.

Federal Funding for Fossil Energy Research and Development

FY 2019

The House and Senate each passed FY 2019 Energy-Water spending bills and are formally involved in a Conference Committee to reconcile the differences among the two bills. CURC is pleased to report that each bill recommends robust support and program direction for the Coal CCS and Power Systems Program consistent with the 2018 Roadmap direction.

FY 2018

In March, the President signed into law the Consolidated Appropriations Act of 2018 which includes funding for the Coal CCS &Power Systems program at DOE. CURC is pleased to report that the bill provides approximately $430 million for the Coal CCS & Power Systems programs of interest to CURC and that align with the CURC-EPRI Roadmap identified program areas.

Senators Manchin and Heitkamp Introduce the FUEL Act of 2018

On May 8, Senators Manchin (D-WV) and Heitkamp (D-ND) introduced the "Fossil Energy Utilization, Enhancement and Leadership Act of 2018" (the "FUEL" Act). The FUEL Act amends the Coal RD&D provisions of the existing

CURC Welcomes New Members

CURC is pleased to announce the addition of three new members to our organization:

Jupiter Oxygen Corporation

Jupiter Oxygen is a privately held Illinois company that has developed and pioneered a revolutionary technology that makes it both practical and cost effective for electric power plants to capture CO2, have ultra low emissions and save fuel. Jupiter Oxygen is a recognized leader in the development, application and use of oxy-fuel technology worldwide. Jupiter's expertise lies in its continued research, development and everyday use of oxy-fuel combustion.

University of Illinois – Prairie Research Institute

The Prairie Research Institute (PRI) is a world-class interdisciplinary research institute. By providing basic and applied scientific research, extensive expertise, and a wealth of data, PRI benefits the environment, economy, and people of Illinois.

PRI's mission is to steward Illinois' natural and cultural resources by providing objective and timely research, data, and expertise to decision makers and stakeholders. Federal, state, and local government decision makers, industry and businesses of all types and sizes, farmers, energy and water utilities, nonprofit organizations, and the public rely on PRI expertise and data.

Energy Policy Network

Energy Policy Network is a national advocacy organization that works hand in hand with state and local leaders and constituencies to develop energy and environmental policies that balance environmental values, business needs and consumer interests.

Senate energy bill (S. 1460, the Energy and Natural Resources Act) with the updated recommendations of the 2018 CURC-EPRI Advanced Fossil Energy Technology Roadmap. CURC issued a press release and letter in support of the bill.

Representatives Veasey, McKinley, Johnson Introduce Fossil Energy Research & Development Act

On May 9, Representatives Marc Veasey (D-TX), David McKinley (R-WV) and Eddie Bernice Johnson (D-TX) introduced the Fossil Energy Research and Development Act which authorizes a new RD&D program that would support CCUS and Advanced Energy Systems programs at DOE. The bill would also encourage DOE to support large-scale pilot projects.
CURC has worked with House Science Committee staff to include provisions that align with the CURC-EPRI Roadmap and commends the work of the Committee and the Congressional sponsors on the introduction of this important legislation. CURC issued a press release in support of the bill.

Shannon Angielski Testifies Before House Science, Space and Technology Subcommittees

CURC Executive Director Shannon Angielski testified on July 17th before the Energy and Environment Subcommittees of the Space, Science and Technology Committee of the U.S. House of Representatives. Ms. Angielski testified as a part of a hearing entitled "The Future of Fossil: Energy Technologies Leading the Way." CURC's testimony is based on the findings of the 2018 CURC-EPRI Roadmap. Ms. Angielski's testimony can be accessed here, and a video stream of the hearing is available here.

USE IT Act Passed out of Senate Environment & Public Works Committee

The Utilizing Significant Emissions with Innovative Technologies (USE IT) Act was passed out of the Senate Environment and Public Works Committee by voice vote on May 22 after a bipartisan substitute amendment to the legislation was adopted. The USE IT Act would expand existing Clean Air Act authority to fund CO_2 utilization and direct air capture research, make CCUS projects and CO_2 pipelines eligible for permitting review processes under the FAST Act, and establish a direct air capture technology advisory board. CURC, along with CURC member NRECA, issued a letter in support of the legislation after its introduction in April.

CURC Submits Comments in Response to DOE RFI on "Coal-Based Power Plants of the Future"

On July 9, CURC submitted comments in response to DOE's Request for Information (RFI) entitled "Coal-Based Power Plants of the Future." CURC's comments align with the intent of DOE's RFI that future coal plants must be able to address the intermittency of the electric grid and discusses several technologies identified in the 2018 CURC-EPRI Roadmap that can be designed as modular, smaller-scale systems that are CO_2 capture ready. CURC's comments address six of twelve questions posed in the RFI. Click here to view CURC's full comments.

CURC MEMBER SPOTLIGHT – PRARIE RESEARCH INSTITUTE

The Prairie Research Institute (PRI) is a world-class interdisciplinary research institute housed at the University of Illinois. By providing basic and applied scientific research, extensive expertise, and a wealth of data, PRI benefits the environment, economy, and people of Illinois through its five unique research organizations. PRI's energy research focuses on improving technology to reduce emissions, assessing the viability of renewable energy resources, identifying & mapping coal, oil, and natural gas resources, and identifying new ways to conserve energy. PRI has two research organizations driving CCUS research:

The Illinois State Geological Survey (ISGS) leads the *Midwest Geological Sequestration Consortium,* a consortium that has successfully stored 1MMT of carbon dioxide in a deep saline reservoir. The ISGS is leading three CarbonSAFE projects to characterize pre-feasibility and feasibility for a 50 MMT storage complex in the region.

The Illinois Sustainability Technology Center (ISTC) is a leader in carbon capture and utilization working with an industrial consortium, comprising global leaders such as Linde and BASF. ISTC programs develop novel carbon dioxide capture technologies and water management programs for industrial and power generation applications.

Six representative projects under the PRI umbrella include researchers working along with private industry partners with support from the U.S. Department of Energy (DOE) and focus on advancing efforts to improve the low-cost capture, utilization, and storage of carbon dioxide.

CarbonSAFE – Macon/Christian County
DE-FE0029381

Researchers are conducting site characterization for a 50 MMT storage complex in Christian County, Illinois. The area is ideally located to receive CO2 from multiple resources and to provide EOR opportunities, as well as storage, in the region.

Large-Scale Capture Pilot
DE-FOA-0001788

Researchers will evaluate the feasibility of scaling up advanced carbon capture technology at a commercial-scale, coal-fired power plant. The technology has been validated at DOE's 1.5 MWe pilot testing program at the National Carbon Capture Center in Wilsonville, AL.

Reducing Amine-Based Aerosol Formation
DE-FOA-0001792

Evaluation of two technologies at the Abbott Power Plant at University of Illinois that have the potential to significantly reduce the formation of amine-based aerosols when amines are utilized as solvents for carbon capture. This would reduce one of the concerns for the use of solvents in the capture of carbon.

Illinois Basin – Decatur Project
DE-FC26-05NT42588

A Phase III Regional Carbon Sequestration Partnership project to demonstrate the safe and viable storage of 1 MMT CO2 from biofuels.

Water Conservation at Power Plants
DE-FOA-0001686

A research team that includes Trimeric Corporation and a major coal-fired utility in Central Illinois, will look at energy-efficient and cost-effective means to reduce/reuse water waste streams within coal-fired power plants.

Enhanced Oil Recovery in Unconventional Reservoirs
DE-FE0024431

Researchers are evaluating the use of CO_2 to enhance oil recovery and store CO_2 in residual oil zones in the mide-continent.

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