PECMC
INTERNATIONAL
Pittsburgh Energy and Carbon Management Conference

Forty-Third Annual International Pittsburgh Energy and Carbon Management Conference

University of Pittsburgh · Swanson School of Engineering

FINAL TECHNICAL PROGRAM

Clean Energy Transformation and Carbon Management for a Sustainable Future

October 28-30, 2026

Virtual Conference via Zoom





Hosted by:

University of Pittsburgh

WELCOME!

On behalf of the Conference Advisory Board, the Conference Committees, and the University of Pittsburgh, we warmly welcome you to the Forty-Third Annual International Pittsburgh Energy and Carbon Management Conference (PECMC 2026), held online via Zoom on October 28–30, 2026.

The theme of this year's conference, "Clean Energy Transformation and Carbon Management for a Sustainable Future," brings together research on energy technologies, fossil fuel utilization, and carbon management. The program also includes Artificial Intelligence and Digital Twin applications in carbon management and energy systems.

The 2026 Technical Program includes 34 technical presentations arranged across 9 numbered sessions, along with six plenary presentations. Topics include clean fuels and hydrogen, gasification technologies, coal science, combustion technologies, carbon management, critical minerals and rare earth elements, and coal bed methane and shale gas. The conference provides a forum for researchers and practitioners to discuss these developments and their role in sustainable energy systems.

This year's invited Plenary Speakers are Mr. Robin Post van der Burg (The Netherlands), Dr. Omar M. Basha (USA), the Honorable Charles D. McConnell (USA), Professor Farid A. Malik (Pakistan), Dr. Ahmed Aboudheir (Canada), and Dr. Evan J. Granite (USA).

We express our sincere gratitude to the Plenary Speakers and Moderators for their support and involvement, to the authors and co-authors of the technical papers, and to the members of the International Technical Program Committee. Special thanks to the session speakers and international delegates for their contributions to the 2026 technical program.

All sessions will be held online in one Zoom virtual room. Each technical presentation is scheduled for 20 minutes, including 5 minutes of live questions and answers. The program lists all presentation times in US Eastern Daylight Time (EDT, UTC−4).

As Chair of the Advisory Board, I deeply appreciate your participation and support. We hope you find PECMC 2026 productive and inspiring, and we look forward to welcoming you to future PECMC conferences.

Sincerely,

Massood Ramezan, Chair



KeyLogic Systems, Inc., USA

CONFERENCE INFORMATION

PECMC 2026

October 28–30, 2026

Virtual Conference via Zoom

All program times are US Eastern Daylight Time (EDT, UTC−4).

Technical Presentations

15 minutes for the presentation and 5 minutes for live Q&A within each 20-minute slot.

THE INTERNATIONAL PITTSBURGH ENERGY AND CARBON MANAGEMENT CONFERENCE

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GENERAL INFORMATION

CONFERENCE OVERVIEW

WEDNESDAY, OCTOBER 28, 2026

Opening Remarks	8:50–9:00
Plenary Presentation 1	9:00–9:30
Plenary Presentation 2	9:30–10:00
Joint Plenary Q&A	10:00–10:20
Break	10:20–10:30
Technical Session 1	10:30–11:50
Lunch Break	11:50–12:50
Technical Session 2	12:50–14:10
Afternoon Break	14:10–14:20
Technical Session 3	14:20–15:40

THURSDAY, OCTOBER 29, 2026

Plenary Presentation 3	9:00–9:30
Plenary Presentation 4	9:30–10:00
Joint Plenary Q&A	10:00–10:20
Break	10:20–10:30
Technical Session 4	10:30–11:50
Lunch Break	11:50–12:50
Technical Session 5	12:50–14:10
Afternoon Break	14:10–14:20
Technical Session 6	14:20–15:20

FRIDAY, OCTOBER 30, 2026

Plenary Presentation 5	9:00–9:30
Plenary Presentation 6	9:30–10:00
Joint Plenary Q&A	10:00–10:20
Break	10:20–10:30
Technical Session 7	10:30–11:50
Lunch Break	11:50–12:50
Technical Session 8	12:50–14:10
Afternoon Break	14:10–14:20
Technical Session 9	14:20–15:20
Closing Remarks	15:20–15:30

PLENARY SPEAKERS

WEDNESDAY, OCTOBER 28, 2026

9:00–9:30 PLENARY PRESENTATION 1

Mr. Robin Post van der Burg
(The Netherlands)
"Two-stage thermal conversion and gasification of torrefied residues: unlocking biomass for methanol, hydrogen, and SAF"

9:30–10:00 PLENARY PRESENTATION 2

Dr. Omar M. Basha (USA)
"From Laboratory to Industrial Deployment: A Landscape Review and Pathway-Selection Framework for Chemical Technology Commercialization"

10:00–10:20 JOINT PLENARY Q&A

THURSDAY, OCTOBER 29, 2026

9:00–9:30 PLENARY PRESENTATION 3

The Honorable Charles D. McConnell (USA)
"CCUS and EOR: A pivotal moment!"

9:30–10:00 PLENARY PRESENTATION 4

Professor Farid A. Malik (Pakistan)
"Building a 21st Century Coal-Based Energy System in Pakistan"

10:00–10:20 JOINT PLENARY Q&A

FRIDAY, OCTOBER 30, 2026

9:00–9:30 PLENARY PRESENTATION 5

Dr. Ahmed Aboudheir (Canada)
"Commercial Lessons from Clean Coal Carbon Capture: Delivering Feasible and Cost-Effective Decarbonization"

9:30–10:00 PLENARY PRESENTATION 6

Dr. Evan J. Granite (USA)
"Domestic Wastes and Byproducts – A Resource for Critical Material Supply Chains"

10:00–10:20 JOINT PLENARY Q&A

GENERAL INFORMATION

Virtual Room (Zoom)		
Wednesday (10-28-2026)	8:50	Opening Remarks
	9:00	Robin Post van der Burg (Plenary Lecture 1)
	9:30	Omar M. Basha (Plenary Lecture 2)
	10:00	Joint Plenary Q&A
	10:20	Break
	10:30	Clean Coal and Gas to Fuels (Session 1)
	10:50	
	11:10	
	11:30	
	11:50	Lunch Break
	12:50	Gasification, Value-Added Coal Products and Coal Science (Session 2)
	13:10	
	13:30	
	13:50	
	14:10	Afternoon Break
	14:20	Coal Science, Critical Minerals and Sustainability (Session 3)
	14:40	
	15:00	
	15:20	
Thursday (10-29-2026)	9:00	Charles D. McConnell (Plenary Lecture 3)
	9:30	Farid A. Malik (Plenary Lecture 4)
	10:00	Joint Plenary Q&A
	10:20	Break
	10:30	Clean Fuels, Clean Hydrogen and Combustion Technologies (Session 4)
	10:50	
	11:10	
	11:30	
	11:50	Lunch Break
	12:50	Carbon Capture, Utilization and Storage (Session 5)
	13:10	
	13:30	
	13:50	
	14:10	Afternoon Break
	14:20	Carbon Storage, Coal Bed Methane and Shale Gas (Session 6)
	14:40	
	15:00	
Friday (10-30-2026)	9:00	Ahmed Aboudheir (Plenary Lecture 5)
	9:30	Evan J. Granite (Plenary Lecture 6)
	10:00	Joint Plenary Q&A
	10:20	Break
	10:30	Coal Science, Clean Fuels and Value-Added Coal Products (Session 7)
	10:50	
	11:10	
	11:30	
	11:50	Lunch Break
	12:50	Gas Utilization, Combustion Technologies, AI and Digital Twin (Session 8)
	13:10	
	13:30	
	13:50	
	14:10	Afternoon Break
	14:20	Coal Bed Methane, Shale Gas and Carbon Management (Session 9)
	14:40	
	15:00	
	15:20	Closing Remarks

TECHNICAL PROGRAM

ORAL SESSIONS
Wednesday, October 28
10:30–15:40 EDT

SESSION 1
CLEAN COAL AND GAS TO FUELS

10:30 Polar-Nonpolar Synergistic Incorporation to Promote Removal of Trace Nitrogen-Containing Compounds from Model Fuels, Yingli Pei, State Key Laboratory of Clean and Efficient Coal Utilization, Taiyuan University of Technology, China.

10:50 Electronic Structure Modulation of NiAl2O4 Catalysts via Reduction Atmosphere Tuning for Efficient Phenanthrene Hydrogenation, Dongxu Zhao, State Key Laboratory of Clean and Efficient Coal Utilization, Taiyuan University of Technology, China.

11:10 Enhanced catalytic hydrogenation of 1-methylnaphthalene over CeO_2-modified $NiAl_2O_4$ spinel catalyst, Haoye Qi, State Key Laboratory of Clean and Efficient Coal Utilization, Taiyuan University of Technology, China.

11:30 Tunable Microstructure of Nano Iron-Based Catalysts for Efficient Direct Coal Liquefaction and Heavy Oil Upgrading, Xinwen Zhang, State Key Laboratory of Clean and Efficient Coal Utilization, Taiyuan University of Technology, China.

LUNCH BREAK 11:50–12:50

SESSION 2
GASIFICATION, VALUE-ADDED COAL PRODUCTS AND COAL SCIENCE

12:50 Pioneering New Pathway of Chemical Energy Utilization in the Coal Industry — An Executive Summary of 18 Years of Technology Strategy Research by an Independent Private Energy Technology Company Addressing Global Climate Change in the Coal Energy Industry, Changdong Zhang, CEPIU & SDUET, China.

13:10 Coal-to-Asphalt: Project Update on Low-Carbon Footprint Asphalt from Wyoming Coal, Jeramie J. Adams, Western Research Institute, USA.

13:30 An overview of Coal beneath federal lands — mines, reserves, and resources, Brian N. Shaffer, U.S. Geological Survey, USA.

13:50 Domestic Coal – A Precious Resource, Evan J. Granite, United States Department of Energy, USA.

AFTERNOON BREAK 14:10–14:20

SESSION 3
COAL SCIENCE, CRITICAL MINERALS AND SUSTAINABILITY

14:20 Graphite – King of the Coal Family, Evan J. Granite, United States Department of Energy, USA.

14:40 A Mathematical Approach to Quantify Heat of Coal Pyrolysis at High Heating Rates, Saurav Pokharel, University of Wyoming, USA.

15:00 FINAL STEP: A FUNDED DOMESTIC COMMERCIAL PLANT TO PRODUCE RARE EARTH ELEMENT (REE) MAGNETS, Howard G. McClintic, Concurrent Technologies Corporation, USA.

15:20 From black coals to nuclear cores: Repurposing and decarbonizing coal power, Mikael Höök, Department of Earth Sciences, Uppsala University, Sweden.

ORAL SESSIONS
Thursday, October 29
10:30–15:20 EDT

SESSION 4
CLEAN FUELS, CLEAN HYDROGEN AND COMBUSTION TECHNOLOGIES

10:30 Hollow Mesoporous Carbon-Shelled CaO–Ca3Al2O6 Sorbents with Tunable Pore Interconnectivity for Durable CO2 Capture in Sorption-Enhanced Hydrogen Production, YuXin Liu, State Key Laboratory of Clean and Efficient Coal Utilization, Taiyuan University of Technology, China.

10:50 Integration of Sorption-Enhanced Water-Gas Shift with Reforming Technologies for Syngas Conditioning: A Comparative Simulation and Techno-Economic Study, Cheng Gu, State Key Laboratory of Clean and Efficient Coal Utilization, Taiyuan University of Technology, China.

11:10 Core-Shell Porous Silica-Converter Dust Nanoparticles with Sintering Resistance for High-Performance Ammonia Cracking Reaction, Xueyan Liu, Huazhong University of Science and Technology, China.

11:30 Oxidation Kinetics of Single Char Particles under Pressurized Oxy-Fuel Conditions, Sheng Zhang, Huazhong University of Science and Technology, China.

LUNCH BREAK 11:50–12:50

SESSION 5
CARBON CAPTURE, UTILIZATION AND STORAGE

12:50 Plasmonic Pd–Ag Bimetallic Synergy on TiO2 for Highly Selective Photothermal CO2 Hydrogenation to Formic Acid, Zijia Kong, State Key Laboratory of Clean and Efficient Coal Utilization, Taiyuan University of Technology, China.

13:10 Highly Conductive and Non-Fluorinated Anion Exchange Membrane for Electrocatalytic CO2 Conversion in Membrane-Electrode Assemblies, Hongxing Kang, Applied Materials Division, Argonne National Laboratory, USA.

13:30 Comparative Study of MOF-Integrated Polyacrylonitrile Nanofiber Membranes for Direct Air Capture of CO_2, Sunith B. Madduri, Prairie View A&M University, USA.

13:50 The Central Appalachian Partnership (CAP) for Carbon Storage Deployment: A Web-Based Tool for Site Characterization, Michele Johnston, Pennsylvania Geological Survey, USA.

AFTERNOON BREAK 14:10–14:20

SESSION 6
CARBON STORAGE, COAL BED METHANE AND SHALE GAS

14:20 Offshore Carbon Sequestration Operations in the United States Outer Continental Shelf: A Literature Review and Synthesis of Potential Impacts to Marine Environments, Joel Sminchak, Battelle, USA.

14:40 Biomass Carbon Removal and Storage (BiCRS) in Unmineable Coal Seams: An Adsorption-Dominated Mechanism Conferring Geologically Permanent Carbon Removal that Resolves the Early-Time Limitations of Conventional CCS, Michael A. Urynowicz, University of Wyoming, USA.

15:00 3D Geological Modelling of a Multi-Seam Coal Deposit for Methane Drainage Optimization in the Budryk Coking Coal Mine, Małgorzata Słota-Valim, Oil and Gas Institute – National Research Institute, Poland.

TECHNICAL PROGRAM

ORAL SESSIONS
Friday, October 30
10:30–15:20 EDT

SESSION 7

COAL SCIENCE, CLEAN FUELS AND VALUE-ADDED COAL PRODUCTS

10:30 Preparation of β-Zeolite Using Quang Ninh Coal Ash in Vietnam and their Reactivity in Catalytic Cracking of LDPE, Atsushi Ishihara, Mie University, Japan.

10:50 Evolution of Carbon Skeleton and Primary Volatiles from Fast Pyrolysis of Low-Rank Coal in N_2 and/or H_2 atmosphere, Yan-Hong Liu, State Key Laboratory of Clean and Efficient Coal Utilization, Taiyuan University of Technology; Shanxi Research Institute of Huairou Laboratory, China.

11:10 Separation of polycyclic aromatic hydrocarbons in coal direct liquefaction oil, Meng-Yao Chen, State Key Laboratory of Clean and Efficient Coal Utilization, Taiyuan University of Technology, China.

11:30 Application of Composite External Electron Donor Technology to Anti-Agglomeration in Coal-Based Polypropylene Production, Peiqian Yu, National Institute of Clean-and-Low-Carbon Energy, China.

LUNCH BREAK 11:50–12:50

SESSION 8

GAS UTILIZATION, COMBUSTION TECHNOLOGIES, AI AND DIGITAL TWIN

12:50 Pakistan Needs Gas, Farid A. Malik, FCC University, Pakistan.

13:10 Overview of Mercury Control Options for Coal-Burning Power Plants, Evan J. Granite, United States Department of Energy, USA.

13:30 CFD simulation of large-scale pressurized oxy-fuel combustion—understanding the mechanism of solid-fuel flame stabilization, Mao Cheng, Washington University in St. Louis, USA.

13:50 Visualization and Quantification of Coal Pores in Atomistic Representations with Eureka Grid Immersion and Retention, Jonathan P. Mathews, Penn State, USA.

AFTERNOON BREAK 14:10–14:20

SESSION 9

COAL BED METHANE, SHALE GAS AND CARBON MANAGEMENT

14:20 Assessment of Geological and Mining Factors Controlling Mining-Induced Methane Accumulation Potential in Underground Coal Mines, Grzegorz Suszka, Polish Geological Institute – National Research Institute, Upper Silesian Branch in Sosnowiec, Poland.

14:40 METH2GEN: An Integrated Approach to Coal Mine Methane Abatement through Hydrogen-Assisted Conversion to Low-Carbon Gaseous Fuels, Renata Cicha-Szot, Oil and Gas Institute – National Research Institute, Poland.

15:00 CO_2 Adsorption and CH_4 Desorption in South African Coals: A Pressure-Temperature-Rank Matrix Approach, Lawrence Koech, Tshwane University of Technology, South Africa.

TECHNICAL PROGRAM

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TECHNICAL PROGRAM

TO ORAL PRESENTERS:

Virtual Conference:

All sessions take place online in one Zoom virtual room.

Time Zone:

All times are US Eastern Daylight Time (EDT, UTC−4), Pittsburgh time. Wednesday begins at 08:50; Thursday and Friday begin at 09:00.

Technical Presentations:

Each technical presentation has 15 minutes for the presentation and 5 minutes for live Q&A, within a 20-minute slot.

Plenary Presentations:

Each morning begins with two 30-minute plenary presentations, followed by a joint 20-minute Q&A from 10:00 to 10:20 and a break from 10:20 to 10:30.

Lunch is 11:50–12:50 on all three days.

Questions:

Contact the Conference Office at ipcc@pitt.edu.

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PROCEEDINGS

The 2026 conference proceedings will be published online after the conference.

Authors should email their English manuscripts to the Conference Office before the conference.

Previous Proceedings

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ANNOUNCING

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