Call For Papers

The Clearwater Clean Energy Conference

The 48th International Technical Conference on Clean Energy
Theme: Carbon Dioxide

June 17 to 20, 2024
Clearwater, Florida, USA

- **Topics are Highly Relevant; Advanced; Science and Technology Driven; and Aimed at Clean Energy Supply;**
- **Attendance can be actual or virtual;**
- **Prime location, adjacent to an international airport;**
- **Reasonably priced;**
- **Participants are highly qualified with 40% of the 2023 papers coming from China, Australia, Canada, Sweden, Japan, Germany, The Netherlands, Poland and Greece**

Deadline for Abstracts: February 20, 2024

Send to: barbarasak@aol.com

CONFERENCE INFORMATION

Under the leadership of Conference Committee Co-Chairs *(Dr. Ronald W. Breault, National Energy Technology Laboratory, U.S. Department of Energy; Prof. Ashwani Gupta, University of Maryland; Dr. Lawrence E. Bool, Linde; and Dr. Edmundo Vasquez, Clean Energy Technologies)* industry experts are taking the lead in organizing sessions on topics of the greatest interest to the industry.

CONFERENCE HIGHLIGHTS

The Panels, Short Courses and Technical Sessions cover all the critical technological issues of the day. We are offering both in-person and virtual presentations.

MISSION STATEMENT – Increased demand – coupled with energy security issues, and uncertainty in the oil sector – **make this conference a must for those involved in all aspects of power generation** who must meet the competitive pressures and environmental concerns in the 21st century.

The current Administration continues to bring in many more opportunities for the energy sector. We plan to cover all the proposed programs and policies. As changes and additions occur, we will cover them.

CONFERENCE HIGHLIGHTS

Through the Technical Sessions, Short Courses, and Panels, cutting-edge developments dealing **with technical solutions to problems; specific strategies; projects; innovations; industry trends; and/or regulatory compliance** will be offered. The program presents an extensive overview of emerging, evolving, and innovative technologies, fuels and/or equipment in the power generation industry. We seek papers from all countries worldwide.

International Programs – Technical Developments – Policy Issues

Papers from the international community are strongly encouraged. At the 2023 conference nine countries were represented at the conference. In addition, one-third of all attendees were from the international community. The international papers were related to energy/environmental developments throughout the world.

PANELS – To provide our attendees with the most comprehensive and up-to-date information from the world's energy leaders, we offer panel presentations covering an overview of emerging, evolving, and innovative technologies, fuels, policy and/or equipment in the power generation industry.

CO_2 WORKSHOP

To highlight this year's conference theme, on Monday, June 17th, we are offering an all-day Workshop on various aspects of **CO_2: removal, point source capture, conversion and sequestration**. We plan on giving attendees an overview of what is happening now and what is planned for the future.

SHORT COURSES On Sunday, June 16th, we will offer Short Courses on a wide variety of topics important to the energy community. Participation is optional and is included in the registration fee

THEMED LUNCHEON A conference favorite is the Themed Luncheon. Industry leaders host tables of 8 where a specific topic is chosen by the host for discussion during lunch. **To host a table all you need is an interesting topic worthy of discussion.**

FIELD TRIPS Tampa Electric is graciously offering us the opportunity to visit the following facilities.

The Clean Energy Center has the following R&D features:

-**Various forms of solar panels**: flexible rooftop, solar flower, solar tables, floating solar -Avalon AFB3 10 kW / 40 kWh Flow Battery

-**New 50 KW Supercapacitor**

-**1MW(AC) Floating solar demonstration** with 2 types of panels (Canadian bifacial and First Solar Series 6) – largest floating solar plant in FL

- **1 MW Agrivolataic** demonstration project (solar installation complete, agriculture part now in development)

-**Vertical-axis wind turbine**

- The initial stages of designing a **commercial microgrid** incorporating the clean energy components on-site

-As well as hiking trails/wildlife viewing tower, kayak trails (possible guided tours), Florida Aquarium Sea Turtle rescue & internationally renowned coral research, Florida Fish & Wildlife Suncoast Youth Conservation Center & Marine Fish Enhancement Center (fish hatchery under construction)

Big Bend Modernization represents a repowering of a 1970's era coal boiler to state-of-the-art Natural Gas Combined cycle using GE H-class combustion turbines.

Southshore Bay Microgrid is a R&D using residential rooftop, battery storage, DC distribution system, and a central energy station (generators and larger batteries) to provide reliable, always-on electricity.

EXHIBIT CENTER We are assessing the situation; and if there is sufficient interest, we will offer an Exhibit Center.

TECHNICAL SESSIONS

At the direction of the Conference Committee, it was decided to broaden the scope of the conference to include some new and exciting technologies currently on the horizon. Industry professionals representing nearly all the major players in the electric utility industry participated in the **47th Clearwater Clean Energy Conference.**

The conference's theme is Carbon Dioxide. We will feature sessions on Carbon Dioxide Capture, Carbon Dioxide Removal, Carbon Dioxide Sequestration, Carbon Dioxide Conversion, Carbon Dioxide as a working fluid and Carbon Dioxide Permitting and Public Awareness.

Additionally, we will have Gasification, Combustion, Environmental Protection and Controls sessions. Gasification sessions will be on biomass, coal, and assorted wastes – separate and co-fueled. Combustion sessions will focus on non-carbon fuels: Hydrogen and Ammonia, as well as on more conventional fuels natural gas, methanol, coal, biomass and wastes.

The controls sessions will focus on Machine Learning/Artificial Intelligence, Cyber-Physical Systems and Digital Twins.

We will offer both virtual and in person presentations.

Clearwater Clean Energy Conference
Proposed Technical Sessions

CARBON DIOXIDE

Area Organizers: *Dr. Ronald Breault, National Energy Technology Laboratory, U.S. Department of Energy; and Andrew Hlasko, U.S. Department of Energy*

Carbon Dioxide Capture

Systems Studies of Point Source Capture

Bob Slettehaugh, Kiewit, and *Tim Fout, National Energy Technology Laboratory, U.S. Department of Energy*

Papers should evaluate point source capture technologies in terms of process cost, performance and life cycle analysis. Pre-combustion, post-combustion and oxy-combustion at either power or industrial point sources are of interest. Analyses of varied detail are sought including from TEA to FEED levels.

Novel Approaches to CO_2 Point Sources

Dr. Ronald Breault and Dr. David Hopkinson, National Energy Technology Laboratory, U.S. Department of Energy

This session seeks papers that present novel materials and systems for point source carbon capture. Applications include industrial point sources such as coal or natural gas electric power production, steel and cement manufacturing, mobile sources, and other emerging applications. Papers can describe materials performance testing, field testing and commercialization efforts.

Carbon Dioxide Conversion

CO_2 Conversion and Low Carbon Products

Dr. Aaron Fuller, U.S. Department of Energy; Dr. Michelle Kidder, Oak Ridge National Laboratory; and Dr. Jarrett Riley, National Energy Technology Laboratory, U.S. Department of Energy

This session seeks papers of the thermochemical, electrochemical and other conversion technologies at all levels of development from conceptual through demonstration.

Carbon Dioxide as a Working Fluid
CO_2 Power Systems Analysis

Eric Liese, National Energy Technology Laboratory, U.S. Department of Energy

Papers should evaluate technologies in terms of process cost, performance and life cycle analysis. Analyses of varied detail are sought including from TEA to FEED levels.

sCO_2 Power Cycle Components and Fundamentals

Matthew Searle, National Energy Technology Laboratory, U.S. Department of Energy and Dr. Andrew Fry, Brigham Young University

Novel Approaches to Carbon Dioxide Removal

Dr. Ronald Breault and Dr. Jarrett Riley, National Energy Technology Laboratory, U.S. Department of Energy

This session seeks papers that present novel approaches, sorbents and solvents for carbon dioxide removal from the ocean as well as the air.

CO_2 Direct Air Capture

Jan Steckel, National Energy Technology Laboratory, U.S. Department of Energy

This session seeks papers that present experimental or computational research on DAC materials development and process design as well as DAC testing protocols including performance, accelerated aging or degradation testing.

Systems Studies for CDR

Tim Fout, National Energy Technology Laboratory, U.S. Department of Energy and Mustapha Soukri, RTI

Papers will evaluate CDR technologies in terms of process cost, performance and life cycle analysis. CDR technologies can include Direct Air Capture, Enhanced weatherization/-mineralization and marine CDR. Analyses of varied detail are sought including from TEA to FEED levels.

Carbon Dioxide Sequestration

Papers sought on fundamental and applied topics related to the design of supercritical CO_2 power cycle components. Experimental and computational studies considering combustors, heat exchangers, and turbomachinery are of interest.

Papers sought on computational and experimental heat transfer studies of supercritical CO_2 as a power cycle working fluid. Topic areas include but are not limited to heat exchanger design, heat transfer enhancement, advanced manufacturing technologies, and turbine cooling for direct-fired cycles.

Other areas for sCO_2 – *Session Chair TBD* – This session seeks papers on the following sessions:

- *Material Issues for sCO_2 Systems*
- *sCO_2 Drying of Materials*
- *sCO_2 Liquefaction of Hydrocarbon Feedstocks to Bio Oils, other*

Carbon Dioxide Permitting and Public Awareness:

CO_2 Policies, Regulations, and Community Engagement/Benefits

Andrew Hlasko, U.S. Department of Energy and Daryl-Lynn Roberts, Visage Energy

This session seeks papers that look at policies, regulations, and community engagement/ benefits both in the U.S. and around the world so as to provide insight to researchers and developers as they move forward with CO_2 control systems.

GASIFICATION

Area Organizers: *Dr. Ronald Breault, National Energy Technology Laboratory, U.S. Department of Energy; and Prof. Ashwani K. Gupta, University of Maryland*

Pyrolysis & Gasification Fundamentals

Prof. Weihong Yang, KTH Royal Institute of Technology, ***SWEDEN;*** *and Dr. Ashwani K. Gupta, University of Maryland; and Dr. Steven Rowan, National Energy Technology Laboratory, U.S. Department of Energy*

Papers are sought that look at all aspects of fundamentals from the material handling step to pyrolysis/gasification step to the ash/waste removal step. Of special interest is waste and opportunity fuels such as various biomasses, plastics and others.

Biomass Conversion to Power and/or Chemicals

Josh Stanislowski, UNDEERC and Dr. John Van Osdol, National Energy Technology Laboratory, U.S. Department of Energy

Biomass provides the potential to create valuable commodities with a net-carbon-negative footprint. This session will explore emerging technologies and advancements for the conversion of biomass to power, chemicals, and fuels such as sustainable aviation fuel.

Hydrogen from Pyrolysis and Gasification

Howard Meyer, GTI Energy, Prof. Ramees Khaleel Rahman, Center for Advanced Turbomachinery and Energy Research; and Dr. Jarrett Riley, National Energy Technology Laboratory, U.S. Department of Energy

This session seeks papers specifically with an applied focus on the pyrolysis and gasification fuels including methane to produce hydrogen and coproducts like carbon nano tubes.

Modeling & Simulation for Gasification Processes

Dr. Ronald Breault, National Energy Technology Laboratory, U.S. Department of Energy

COMBUSTION

Area Organizers: *Dr. Larry Bool, Linde and Dr. Ashwani K. Gupta, University of Maryland*

Oxy-Fuel Combustion

Dr. Richard Axelbaum, Washington University in St. Louis, and Xuebin Wang, Xi'an Jiatong University, **CHINA**

Replacement of Conventional Fuels in the Petrochemical Area

Dr. Ronald Breault, National Energy Technology Laboratory, U.S. Department of Energy

Hydrogen Combustion

Dr. Marc Cremer, Reaction Engineering International and Dr. Pete Strakey, National Energy Technology Laboratory, U.S. Department of Energy

Combustion R&D

Dr. Ashwani K. Gupta, University of Maryland, and Massood Ramezan, KeyLogic

Papers are sought on fundamental combustion of solid, liquid and gaseous fuels and unique applications.

Energy Conversion in Rotary Kilns

Klas Andersson, Chalmers University, ***SWEDEN*** *and Prof. Lunbo Duan, and Prof. Yueming Wang, Ph.D., Southeast University,* ***CHINA***

Municipal Solid Waste Combustion

Alan Paschedag, Covanta

NH_3 Combustion

Dr. Ronald W. Breault, National Energy Technology Laboratory, U.S. Department of Energy

This session seeks papers on all aspects of NH_3 combustion, from fundamentals to demonstrations and from industrial to turbine applications.

Plant Conversions & Fuel Switching

Tim Fuller, The Babcock & Wilcox Co., and Brian Vitalis, Riley Power

As the world moves in the direction of decarbonizing industrial and utility energy conversion processes, owners are converting existing plants to alternative energy conversion processes and technologies to reduce carbon emissions. This session presents promising and/or successful conversion options that demonstrate the viability of this decarbonization strategy.

Modeling & Simulation for Combustion Process

Prof. Ashwani K. Gupta, University of Maryland

PC Fired Units

J.J. Letcovits, Consultant, and Alan Paschedag, Covanta

PC plants are still the backbone of the power industry. Papers sought on all areas of PC powerplant operations from combustion and fuel handling to emissions to issues from cycling.

ENVIRONMENTAL PROTECTION Policies, Regulations and Community Engagement/Benefits in the Energy Sector

Area Organizers: *Dr. Edmundo Vasquez, Clean Energy Technologies and Dr. Massood Ramezan, KeyLogic*

Ecofuels

Dr. Edmundo Vasquez, Clean Energy Technologies

Modular Systems for Conversion of Carbon-Based Solids

Jonathan W. Lekse, National Energy Technology Laboratory, U.S. Department of Energy; and Frederick Baddour, National Renewable Energy Laboratory

Carbon is an integral component of virtually every aspect of our modern society; from the production of chemicals and polymers that are prolific in the majority of consumer products, to the burning of natural gas and coal for energy that powers our lives. We have become dependent upon carbon and the roles that carbon plays in society is unlikely to change; however, it is becoming increasingly apparent that a change is needed to mitigate the worst effects that releasing carbon into the atmosphere is having on the climate. New, more sustainable sources for carbon and its conversion into chemicals, fuels, and energy are needed to preserve the climate while maintaining the quality of modern life. This session will focus on modular systems for carbon conversion that address these goals by reducing capital costs, have enhanced mobility to enable system reuse, can be scaled through aggregation, and afford simplified maintenance.

Net Zero Carbon Emissions

Massood Ramezan, KeyLogic

Deriving More Value from Waste – Maximized Utilization of Mined Materials

Dr. Dave Osborne, Somerset, ***AUSTRALIA*** *and Melanie Mackay, Mining Engineering, University of British Columbia, Vancouver,* ***CANADA***

(Ultimate goal is "Zero Waste" and Maximized Recycling of Water for Re-use) Thus, papers are sought on building products and construction materials, soil additives and conditioners and other products – cements and refractories.

Emissions

Dr. Edmundo Vasquez, Clean Energy Technologies, and Byron Burrows, TECO

Modeling & Simulation for Environmental Applications

Dr. Edmundo Vasquez, Clean Energy Technologies

Recovery of Rare Earth Elements

Melanie Mackay, Mining Engineering, University of British Columbia, ***CANADA;*** *Dr. Evan Granite, U.S. Department of Energy and Dr. Dave Osborne, Somerset Coal,* ***AUSTRALIA***

Papers sought on the recovery of critical minerals including rare earth elements from mining waste, combustion waste and other sources.

PROCESS CONTROLS

Area Organizers: *Dr. Dave Tucker, National Energy Technology Laboratory, U.S. Department of Energy and Dr. Rob Hovsapian, National Renewable Energy Network*

Artificial Intelligence/Machine Learning Approach for Energy Systems and Data Analytics-/Digital Twins/Controls

Dr. Rob Hovsapian, National Renewable Energy Network

Methods and approach of ML to improve modeling based on energy systems and enhance the scalability analysis of complex energy systems will be presented. The scalability analysis extends itself to multiple technologies for up-scaling and down-scaling technology characteristics while considering non-linearities for at-scale evaluation. This includes capacity scaling in power and energy conversion devices based on high-fidelity data and physics; and for hydropower, ML representations based on field data from a plant and its use in control prototyping.

Cyber-Physical Systems for Control and Controls Development

Dr. Dave Tucker, National Energy Technology Laboratory, U.S. Department of Energy

Cyber-physical systems represent the embodiment of intelligent power systems needed for dealing with extreme transient and flexibility requirements of future grid needs as we transition to a renewable energy sector. The session will focus on the application of cyber-physical systems to simulations used for novel power system technology development and co-design of components, system integration, and controls.

AI and ML Applications and Planned Deployments

Papers are sought on AI technologies applied in clean energy, especially in thermal power and wind energy, The data driven technologies applied in renewable energy, e.g., forecast of wind energy through AI and Coupling between thermal power plant with renewable energy for safe grid.

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Theme: Carbon Dioxide
The 48th International Technical Conference on Clean Energy
June 17 to 20, 2024
Sheraton Sand Key, Clearwater, Florida, USA

ABSTRACT REQUIREMENTS

The **ONE PAGE ABSTRACT,** required by **February 20, 2024,** must be submitted via email and include:

- The Proposed Paper with Exact Title and one page of information (no equations and no figures) must summarize the objective and current status of the work; and provide the committee with an accurate scope of the paper. **Please indicate under which Technical Topics this paper falls** and whether you will present in person or virtually.

- Principal Presenter Listing (name, title, company, address, phone, and email). Email addresses are required since this will be the primary mode of communication. Please include Complete Listings for all Co-Authors (name, title, company, address, phone, FAX and email).

The Clearwater Clean Energy Conference does not provide financial support to authors. The registration fee covers one technical paper; authors submitting more than one paper must include an additional $100 per paper.

Notification of acceptance will be made immediately. A manuscript for inclusion in the Proceedings and for distribution on thumb drive (not to exceed 12 pages in length, with illustrative material) is required by **May 15, 2024.**

Instructions for the preparation of manuscripts will be sent with letters of acceptance. Presentations will be scheduled in Panels and Technical Sessions, as determined by the Conference Committee. The **ONE-PAGE** abstract should be sent via email to BarbaraSak@aol.com.

Best Student Paper Award – Over the years the conference has benefitted from

The Principal Presenter is the person to whom all correspondence will be sent and who must meet the deadlines and obligations of the conference: making a presentation at the 2024 conference; submitting a manuscript; and paying a reduced conference fee. The non-refundable registration fee of $895 is due before March 31, 2024. There is no reimbursement for time spent or expenses incurred in preparing manuscripts or illustrations, or for transportation to, and expenses at the conference.	the many excellent papers given by students. To give these exceptional students well-deserved recognition, the Conference Committee awards the best paper from a student with the **Clearwater Clean Energy Conference Best Student Paper Award.** The student will be evaluated on the quality of the paper, grasp of the topic presented and quality of the presentation at the conference. The student must be present to win.

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Sheraton Sand Key
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SPEAKER REGISTRATION

Now to February 29, 2024:
$895 In Person
$450 Virtual
$450 Students

March 1st to April 30, 2024
$950 In Person
$525 Virtual
$500 Students

May1st to the conference
$995 In Person
$550 Virtual
$550 Students

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First Name for Badge

Title

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City

State

Zip

Country

Phone

Email

Registration Fee: **$_____**

TOTAL: **$_____**

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☐ **The Clearwater Clean Energy Conference**

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