



## American Institute of Chemical Engineers, Cleveland Section

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# Thursday, February 15, 2024, 6:00 PM

AICHE Membership is Not Required to attend any meetings



## **“DOE Award Update of the ARCH2 Regional Clean H2 Hub”**

The Sanctuary Restaurant, DoubleTree Hilton Hotel by Rockside Road & I-77

6200 Quarry Lane, Independence, OH 44131, 216-901-7852

**Andrew Thomas, J.D.**, Executive in Residence, Energy Policy Center, Levin College, Cleveland State University, Email address: [a.r.thomas99@csuohio.edu](mailto:a.r.thomas99@csuohio.edu), Phone: 216-687-9304

**Abstract:** The Department of Energy (DOE) has awarded about \$ 1 Billion to the Appalachian Regional Clean Hydrogen Hub (ARCH2). This region is in Ohio, Pennsylvania, and West Virginia. The ARCH2 project will ramp up the hydrogen economy in this region, with existing markets for transportation, power generation and industrial use. Growth in these markets will require hydrogen generated by both steam methane reformation and electrolysis. The presentation will discuss the Ohio Clean Hydrogen Hub Alliance strategies to advance the hydrogen economy in Ohio. The presentation will also discuss the anticipated hydrogen markets and federal incentives to decarbonize through the hydrogen economy.

**Biography:** Mr. Andrew Thomas directs the Energy Policy Center at the Levin College of Public Affairs and Education at Cleveland State University, where for 13 years he has led research on the hydrogen economy, electricity regulation and markets, microgrids, transportation, energy storage, district energy, and oil and gas development. He is also the director for the Midwest Hydrogen Center of Excellence (MHCE). He is chairman of the Ohio Oil and Gas Commission. He received his J.D. from Loyola University of New Orleans, where he was a law review editor.

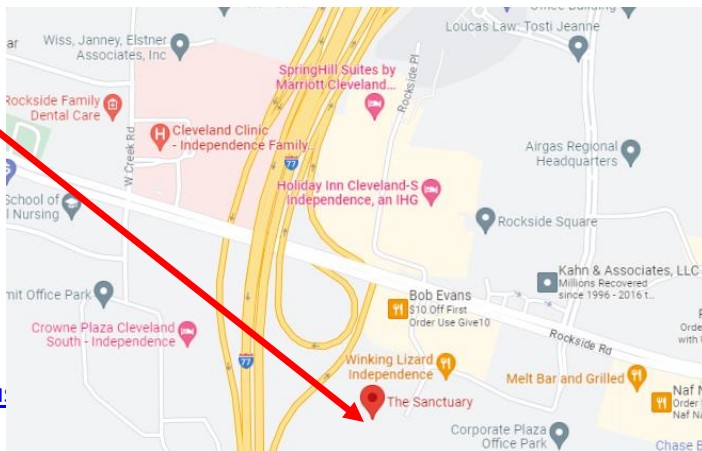
*For those attending this event, a Professional Development Hour Certificate (1 PDH) will be sent to you in the following days by Joe Yurko.*

**Meeting Location:**  
6200 Quarry Lane  
Independence, OH 44131  
216-901-7852

**The Sanctuary Restaurant** (see map below)  
6:00 – 7:00 pm: Social Gathering  
7:00 – 8:00 pm: Dinner  
8:00 – 9:00 pm: Presentation with Q & A

**Dinner:** Non-Students: All ordering from menu  
Students: \$5 each

**Menu:**  
<http://places.singleplatform.com/shulas-steak-house/>



**RSVP Required** by Friday 9Feb2024 with Joseph Yurko and AIChE at: [yurkojoe5@gmail.com](mailto:yurkojoe5@gmail.com)

## JANUARY 2023 CLE AIChE MEETING: PROCESS SAFETY FUNDAMENTALS

WITH GURMUKH BHATIA, CPSA; PRESIDENT OF RPSC, LLC; RISK AND PROCESS SAFETY CONSULTING



Gurmukh Bhatia with Mike Galgoczy



Mike Fricke with Braille Periodic Table of Elements, ACS



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## **Discover E**

<https://discovere.org/programs/engineers-week>

### **2024 National Engineers Week: Welcome to the Future**

Founded by NSPE in 1951, [Engineers Week](#)(link is external) (February 18-24, 2024) is dedicated to ensuring a diverse and well-educated future engineering workforce. This latest Engineers Week theme — Welcome to the Future — is about celebrating today's achievements and paving the way for a brighter and more diverse future in engineering.

With the arrival of artificial intelligence, smart cities, electronic vehicles and more, there's no denying that the future is here. It will be up to qualified, ethical professional engineers to usher in these powerful advancements responsibly.

Engineers Week is a time for you to celebrate how engineers make a difference in our world and engage students in engineering. It's also an opportunity to add your voice to the conversation about the need for engineers, technicians, and technologists. Consider the following activities for your Engineers Week celebrations and outreach:

- Join us on social media #Eweek2024
- Host an Engineers Week lunch or dinner
- Invite an inspiring speaker(s) for a lecture or panel
- Write a blog post or article
- Visit a classroom or afterschool program
- Invite a student(s) to shadow you at work
- Present engineering careers
- Volunteer at a science and engineering competition



## Vistra to Create "Vistra Vision," a Leading Zero-Carbon Generation and Retail Platform, Through the Acquisition of Energy Harbor



NEWS PROVIDED BY: Vistra Corp. 06Mar2023, 07:37 ET

Vistra Board increases aggregate share repurchase authorization by \$1 billion; remaining ~\$1.8 billion authorization expected to be completed by year-end 2024

<https://www.prnewswire.com/news-releases/vistra-to-create-vistra-vision-a-leading-zero-carbon-generation-and-retail-platform-through-the-acquisition-of-energy-harbor-301763264.html>

### Highlights

- Transaction will combine Energy Harbor's nuclear and retail businesses with Vistra's nuclear and retail businesses and Vistra Zero renewables and storage projects under a newly formed subsidiary holding company, referred to generally as "Vistra Vision."
- Accelerates the growth of Vistra's zero-carbon operations, adding ~4,000 megawatts (MW) of nuclear capacity and ~1 million retail customers.
- In total, Vistra Vision will be a large-scale ~7,800 MW zero-carbon generation business with ~5 million retail customers across the United States, and it will also have access to a growth pipeline of ~1,100 MW of additional renewables projects.
- Consideration to Energy Harbor for this combination includes \$3 billion cash and a 15% ownership interest in Vistra Vision; in addition, Vistra Vision will assume ~\$430 million of net debt from Energy Harbor. Most Energy Harbor shareholders will receive cash at closing, and the two largest shareholders, Avenue Capital Group and Nuveen, will receive a combination of cash and the 15% ownership interest.

- Transaction is expected to generate at least \$125 million in annual run-rate synergies by year-end 2025 from increased scale, optimized operations, and cost structure efficiencies.
- Vistra will own 85% of Vistra Vision as well as 100% of the entities holding its remaining conventional generation assets, referred to generally as "Vistra Tradition."
- Vistra does not expect any significant changes to its capital allocation plan, including its long-term net leverage target of less than 3x (excluding any non-recourse financing at Vistra Vision), and the expected return of capital to its shareholders by way of the expected \$300 million in annual dividends and at least \$1 billion of share repurchases each year.
- Vistra to host a conference call today, March 6, 2023, at 9:00 a.m. Eastern.

IRVING, Texas, March 6, 2023 /PRNewswire/ -- Today, Vistra Corp. (NYSE: [VST](#)) announced that it has executed a definitive agreement with Energy Harbor Corp., pursuant to which Energy Harbor will merge with and into a newly-formed subsidiary of Vistra. The transaction will combine Energy Harbor's nuclear and retail businesses with Vistra's nuclear and retail businesses and Vistra Zero renewables and storage projects under a newly-formed subsidiary holding company, referred to generally as "Vistra Vision." This combination creates a leading integrated retail electricity and zero-carbon generation company with the second-largest competitive nuclear fleet in the country, along with a growing renewables and energy storage portfolio. The agreement has been approved by both companies' boards of directors. Sufficient stockholder approval for the transaction has been committed through support agreements signed by a majority of the Energy Harbor stockholders.

## Chemical & Engineering News, American Chemical Society Publication

### Divining the mysteries of the atomic nucleus

New research at the edge of the nuclear landscape is illuminating the most powerful force in the universe and teaching scientists how elements are forged in stars

<https://cen.acs.org/physical-chemistry/astrochemistry/Divining-mysteries-atomic-nucleus/102/i3>

by ***Katherine Bourzac, special to C&EN***

January 28, 2024 | A version of this story appeared in **Volume 102, Issue 3**

More than 100 years after scientists began studying the atomic nucleus, they still don't understand what holds it together. The nuclear force is the strongest force in the universe, yet it remains mysterious. Scientists can't reliably predict the structure and behavior of nuclei. New research with more powerful tools is bringing surprises and scientific insights. By making and observing rare isotopes in the lab, scientists are learning more about the structure of the nucleus and the glue that holds it together. This work should help nuclear theorists fill in the missing pieces in their models. It's also helping astrophysicists understand the details of how elements are made in the universe and the physics of neutron stars.

Oxygen is the most abundant element in Earth's crust and the third-most-common element in the entire universe. It sustains life as we know it on this planet, making it possible to take a breath, light a match, and manufacture plastics and steel.

But even this extremely common and well-studied element is still poorly understood at its very core, the atomic nucleus. More than 100 years after the birth of nuclear physics, scientists still can't reliably predict how the oxygen nucleus—or any other nucleus—will behave when pushed to its limits.

Results that [Takashi Nakamura](#), a nuclear physicist at the Tokyo Institute of Technology, has been working on for years and published late last summer brought this home for him. Nakamura is part of the team that made the first observations of the long-sought isotope oxygen-28. According to what 20th-century physicists knew about the laws of the atomic nucleus,<sup>28</sup> O should have been stable, even though it has 12 more neutrons than the common form,<sup>16</sup> O. But Nakamura and his colleagues found that<sup>28</sup> O fell apart as soon as they made it...

## Chemical & Engineering News, American Chemical Society Publication

### Reactions: Thorium for nuclear power

December 3, 2023 | A version of this story appeared in [Volume 101, Issue 40](#)  
<https://cen.acs.org/energy/nuclear-power/Reactions-Thorium-nuclear-power/101/i40>

By: Lawrence Ingram, Greenville, North Carolina

#### LETTERS TO THE EDITOR

This is a response to the [editorial of Sept 18, 2023](#) ( page 2).

I agree 100% with the premise that nuclear power can serve our energy needs for the future. However, the use of thorium is a better choice for the smaller modular reactors. Thorium should be strongly considered for nuclear reactors for the US and world energy needs to significantly reduce carbon dioxide emissions. Thorium is more abundant and more safely mined than uranium. Thorium power cannot develop a runaway, uncontrolled reaction like uranium reactors. Thorium reactors are less costly, and permitting should be considerably less of a challenge. Thorium reactor by-products cannot make nuclear bombs since the wrong isotopes are produced. They produce less radioactive waste, and these by-products are safe after about 100 years, versus 24,000 years for uranium reactors. The safe storage of thorium nuclear waste is much less complex. Thorium alleviates the concerns that people have about nuclear reactor safety.

CANDU (Canada deuterium uranium) thorium reactors have already been built. The US has built 1, 3, and 5 MW prototypes and evaluated them, indicating that development work has been significant. Grid connection is not an issue since the electricity is constant. Many nations could be provided safe and reliable electricity using thorium nuclear power.

Now is the time for thorium to be in the energy discussion. Thorium nuclear energy should be an important component for power generation and is safer than uranium for this use. The US and the world need it.

# PE Magazine, National Society of Professional Engineers

## A Focus on Sustainability And Resilience – COP28

<https://www.nspe.org/resources/pe-magazine/fall-2023/focus-sustainability-and-resilience-cop28>

[Home](#) » [PE Magazine](#) » [Fall 2023](#) » A Focus on Sustainability And Resilience – COP28

### Fall 2023 PE Report

NSPE believes licensed PEs should be good stewards of the environment to preserve and protect the world for future generations. NSPE recently provided [highlights](#) of the United Nations Climate Change Conference (COP28) in Expo City, Dubai (United Arab Emirates), November 30–December 13.

### Highlights

Two weeks before the opening of COP28, the US and China announced a climate agreement. Together, they account for nearly 40% of global greenhouse gases. This agreement raised expectations for the conference.

One of the primary discussion topics on the second day of COP28 was the reformation of the global financial system in order to lower barriers preventing developing countries from accessing financing for efforts to combat and adapt to climate change.

The seventh day of the conference introduced a pledge for nations to work together to advance a goal of tripling nuclear energy capacity by 2050, recognizing the key role of nuclear energy in achieving global net-zero greenhouse gas emissions and carbon neutrality. The pledge compels participants to ensure that nuclear power plants are operated responsibly and in line with the highest standards of safety, sustainability, security, and non-proliferation, and that fuel waste is responsibly managed for the long term.

President Biden’s climate envoy announced a new carbon credit initiative in which more than a dozen major companies (e.g. Walmart, Pepsi, and McDonald’s) will help developing countries participate in the transition from fossil fuels to renewable energy.



### New space sensor spots greenhouse gas sources

Instrument for studying desert dust also detects methane and carbon dioxide plumes

<https://cen.acs.org/environment/New-space-sensor-spots-greenhouse/101/i40>

by [Priyanka Runwal](#), December 3, 2023 | A version of this story appeared in [Volume 101, Issue 40](#)

In 2022, an imaging spectrometer developed at NASA's Jet Propulsion Laboratory (JPL) was installed on the International Space Station. It was designed to study dust particles from arid areas and understand how their presence in the atmosphere affects Earth's climate. Researchers are now using the instrument to detect greenhouse gas emissions.

In a recent study, they spotted methane and carbon dioxide plumes from oil and gas operations, power plants, landfills, and wastewater treatment facilities in the Middle East and Central Asia (*Sci. Adv.* 2023, DOI: [10.1126/sciadv.adh2391](https://doi.org/10.1126/sciadv.adh2391)). The strengths of the technology are its fine-scale mapping capabilities and wide geographic coverage, says Andrew Thorpe, a research technologist at JPL and the study's lead author.

The instrument captures images of Earth from space at a resolution of 60 m per pixel, scanning strips of land as the space station orbits the planet and covers an area about the size of South Africa every day. Such high resolution is necessary to detect plumes that are typically less than 1 km long and that contain high concentrations of methane and CO<sub>2</sub>. Instruments mounted on aircraft often provide these measurements, but their coverage is limited by how far and how often they can fly. These surveys can miss emissions that tend to be intermittent.

In the first month of the spectrometer's operation, Thorpe and his colleagues could identify CO<sub>2</sub> plumes from two coal-fired power plants in China that lacked continuous emission monitoring and reporting. They were also able to detect methane plumes from oil and gas operations, landfills, wastewater treatment and power plants in several countries...

## PE Magazine, National Society of Professional Engineers

### Tomorrow's Workforce Act Continues to Gain Traction

<https://www.nspe.org/resources/pe-magazine/fall-2023/tomorrow-s-workforce-act-continues-gain-traction>

[Home](#) » [PE Magazine](#) » [Fall 2023](#) » [Tomorrow's Workforce Act Continues to Gain Traction](#)

#### Fall 2023 PE Report

The Freedom to Invest in Tomorrow's Workforce Act (H.R. 1477) is poised to tackle the national challenge of shortages in STEM-related fields, gaining notable bipartisan support on Capitol Hill. NSPE continues to support the legislation that aims to empower individuals by allowing the use of 529 accounts for training and postsecondary credentials that are recognized by state and federal governments.



NSPE, in collaboration with fellow members of the Tomorrow's Workforce Coalition, recently endorsed a letter addressed to key congressional committee leaders. This letter underscores the Act's significance in addressing critical workforce challenges and emphasizes the urgent need for its passage. If the legislation passes, the 529 plans can help cover expenses for the following: certification program tuition; testing fees, including practice exams; required books and equipment; continuing education and certification renewal; and other charges required to obtain and maintain a certification and license.

Despite the Act achieving a significant milestone with over 100 bipartisan cosponsors in both the US House of Representatives and Senate, challenges remain. The legislative landscape presents competition with other proposals, conflicting priorities, and political complexities. NSPE underscores the importance of sustaining momentum through ongoing advocacy efforts to ensure the Act's successful passage.

## PE Magazine, National Society of Professional Engineers

### Career Days Boost STEM Interest

<https://www.nspe.org/resources/pe-magazine/fall-2023/career-days-boost-stem-interest>

[Home](#) » [PE Magazine](#) » [Fall 2023](#) » Career Days Boost STEM Interest

#### Fall 2023 PE Report

The University of Missouri recently published a study which shows that high school students who attend college-hosted STEM Career Days are far more likely to pursue a career in a related field.

Michael Williams, an assistant professor in the MU College of Education and Human Development, analyzed a Harvard University survey in which around 16,000 college students were asked if they had attended such a career day while in high school. He discovered that those who responded "yes" were disproportionately more inclined to have STEM related career aspirations than those who responded "no."

Williams, who is also a faculty fellow in the MU Division of Inclusion, Diversity & Equity, is interested not only in cultivating interest in STEM career paths but also in enhancing inclusivity. "Now that we have found that this type of intervention works for turning that potential interest in STEM into career aspirations in STEM, we can work on designing these interventions in a way to be even more effective and accessible to develop a more diverse STEM workforce," he said. "If you want someone to be good at something, you want them to develop a sense of efficacy, which is about putting them in a position where they can see themselves doing it and succeeding at it, and seeing other people that look like them doing it as well."

## Chemical & Engineering News, American Chemical Society Publication

### 10 Start-Ups To Watch

#### H2O Pro, Making Green Hydrogen Cheaper with a 2-Step Electrolyzer

<https://cen.acs.org/business/start-ups/CENs-2023-10-Start-Ups-Watch/101/i37#on-our-radar>

by Alex Scott

Most of the world's hydrogen is made unsustainably from methane or coal, and today most of it is used to produce petroleum-based fuels and chemicals. But the start-up H2Pro says hydrogen could also be key to slowing climate change if it is made without fossil fuels. This can be done by taking hydrogen out of water using renewable electricity.

Scientists have long known how to extract hydrogen from water. But existing electrolyzers, [the machines used to split water molecules](#), convert only about 70% of the electric energy they use into chemical energy, which is stored as hydrogen.

H2Pro has devised a two-step process that generates hydrogen and oxygen in separate steps, ensuring they don't mix. Hen Dotan, H2Pro's cofounder and chief technology officer, says his company's technology converts about 95% of the electricity it uses into chemical energy, a rate that would yield substantial financial savings at commercial scale.

In H2Pro's [two-step process](#), hydrogen gas is released in an electrochemical reduction reaction at the cathode. Meanwhile, hydroxide ions (OH<sup>-</sup>) oxidize a nickel hydroxide (Ni(OH)<sub>2</sub>) anode into nickel oxyhydroxide (NiOOH), thereby closing the electrical circuit without generating oxygen. Subsequently, the electricity is turned off and the NiOOH anode reacts with water to release oxygen, transforming the anode back to Ni(OH)<sub>2</sub>, which is ready for the reaction to start over when electricity is reintroduced.

## HPAC Engineering

### Heating, Piping, Air Conditioning Magazine

#### HPAC 'On The Air': COP28 Recap with USGBC's Liz Beardsley

<https://www.hpac.com/home/article/21281932/hpac-on-the-air-cop28-recap-with-usgbc-liz-beardsley>

Jan. 31, 2024

"NEW PODCAST\* One of our industry's leading sustainability experts returns to rate the results of the latest global climate summit.

Frustrations ran high at the annual global climate summit in Dubai in December, but this month's guest says there were still more than a few positive takeaways for our industry; more best practices to share and relationships to build on in pursuit of a common, urgent goal.

U.S. Green Building Council senior policy counsel **Elizabeth Beardsley** here returns to *HPAC 'On The Air'* for the third year in a row, to give us her first-person account of what took place over the conference's two contentious weeks. Many had worried that this COP may end up a 'cop-out,' or setback, for the sustainability movement. But Beardsley says the international momentum toward progress continues and it still is just too strong to be turned back.

Listen in for more insights... *To listen to previous 'HPAC On The Air' podcasts, visit our [Members Only page](#).*

## Chemical Engineering Progress Magazine, AIChE Publication

### The Planet's Remaining "Carbon Budget" Is Running Out

<https://www.aiche.org/resources/publications/cep/2023/december/cep-news-update/planets-remaining-carbon-budget-running-out>

December 2023

Humanity is running out of time to keep Earth's global average temperature increase to 1.5°C above pre-industrial levels, according to a new analysis.

The Paris Agreement, adopted by 196 nations in 2015, aimed to reduce greenhouse gas emissions to keep global warming under this level, in an attempt to avoid the worst consequences of sea level rise, ocean acidification, and ecosystem damage. But most countries' actions have consistently fallen short of their pledges to reduce carbon emissions in the eight years since, raising persistent questions about whether the Paris Agreement's goals can be met.

A new analysis suggests that the window is closing. If emissions continue at current rates, the remaining carbon budget to reach 1.5°C will be exhausted by 2029.

"So far, we have not been doing enough to even start meeting our commitments," says Robin Lamboll, a research fellow in climate science and policy at Imperial College in the U.K., who led the new analysis.

Lamboll is part of the Indicators of Global Climate Change (IGCC) initiative, which aims to track climate indicators highlighted by the Intergovernmental Panel on Climate Change (IPCC), the United Nations (UN) body that handles climate policy. In the new study, Lamboll and colleagues worked to narrow the uncertainty around how the climate system will respond to future emissions.

## PE Magazine, National Society of Professional Engineers

### Good Samaritan Law Protections

<https://www.nspe.org/resources/pe-magazine/fall-2023/good-samaritan-law-protections>

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**Fall 2023** On Ethics: You Be The Judge / Contest

### What are a PE's ethical obligations when volunteering during a natural or man-made disaster?

#### The Board of Ethical Review

Engineers, like other professionals, have a history of performing pro-bono work. As litigation has become more prevalent in our society, some engineers have become reluctant to lend their time and expertise to volunteer work. When a "Good Samaritan" law was proposed in Ohio's 2015 legislative biennium, NSPE indicated that professional engineers who voluntarily assist their communities, states, and the nation in times of crisis, when requested by the appropriate public official, should be protected from liability exposure when performing these duties.

In testimony to the Ohio Legislature regarding this bill, AIA Ohio's immediate past president stated that architects are unable to volunteer in emergencies because of their status as licensed professionals - they risk losing their licenses if they offer opinions on damaged structures if contractual language is not in place.

Similarly, a February 2013 article about New York's Volunteer Protection Act, the NYSSPE stated: We know that many of our members want to volunteer, but when doing so, please remember that volunteering is not without risk.

The [Code of Ethics](#) encourages engineers to contribute to their community; lending skills during a disaster is certainly work for the advancement of the safety, health, and well-being of their community. Note too that an engineer's ethical obligations to their employer allow accepting outside work consistent with employer's policies and prohibit use of the employer's equipment for outside activities without the employer's consent.

Professional obligation III.8 speaks directly to seeking indemnification for professional activities. [BER Case 96-12](#) deals specifically with this section of the code of ethics (as does related BER Case 93-8).

## **NSPE Ethics Resources**

The Society provides members with a wide selection of ethics resources that can help prepare them for dealing with difficult issues. The resources can be accessed on the [NSPE website](#).

### **Code of Ethics for Engineers**

Engineering is an important and learned profession. As members of this profession, engineers are expected to exhibit the highest standards of honesty and integrity. The Code of Ethics offers guidance through its fundamental canons, rules of practice, and professional obligations.

### **Licensure and Ethics Hotline**

NSPE members that have a question about engineering licensure and ethics issues can send their inquiries to [ethics@nspe.org](mailto:ethics@nspe.org) (link sends e-mail).

### **On-Demand Courses**

Looking for online engineering ethics seminars? NSPE offers webinars that are available 24/7 and free to members through the PE Institute.

### **The Order of the Engineer**

Initiated to foster pride and responsibility in the engineering profession, the Order offers a visible symbol to identify engineers: a stainless steel ring on the little finger of their working hand. The Order is not a membership organization; there are no dues or meetings.

### **More On Ethics Articles:**

[NSPE Ethics Resources \(September, 2023\)](#)

[How to Avoid Doing Bad Things for Good Reasons: Lessons from a Study of Professional Engineers \(July, 2023\)](#)

[A Source of Inspiration \(February, 2023\)](#)

[Ethical Business Culture is Stronger After Pandemic \(May, 2022\)](#)

[Engineering's Public-Protection Predicament \(January, 2022\)](#)

# Chemical & Engineering News, American Chemical Society Publication

Comment: American Chemical Society's commitment to sustainability and green chemistry

<https://cen.acs.org/acs-news/comment/Comment-American-Chemical-Societys-commitment/101/i41>


by Carolyn Ribes, ACS director-at-large December 16, 2023 | A version of this story appeared in [Volume 101, Issue 41](#)

Two years ago, the ACS Board of Directors announced \$50 million in investments over 5 years for [four strategic initiatives](#) that would have a positive impact on the world and the chemistry enterprise by 2026. Significant progress has been made in all four areas, one of which is the Campaign for a Sustainable Future. The purpose of this initiative is to ensure that ACS provides leadership in support of achieving the 17 United Nations sustainable development goals (SDGs). As a member of the ACS Green Chemistry Institute Advisory Board, I've had the opportunity to learn about the great strides that the campaign has already made, as well as the impressive work of the ACS Green Chemistry Institute (GCI).







One pillar of the campaign has been the ACS sustainability summits. In 2022, ACS hosted the ACS Sustainability [Zero Hunger Summit](#). This meeting addressed SDG 2: zero hunger and featured speakers on a variety of topics, including the interactions between climate and agriculture, the optimization of crop production, and sustainable packaging and reducing waste. The *Discovery Report* and [recordings of the presentations](#) are available at [www.acs.org](http://www.acs.org). The second sustainability summit, [Reimagining Chemistry Education](#), aligned with SDG 4: quality education. This meeting was held earlier this month in partnership with the ACS Division of Chemical Education and Beyond Benign. The purpose was to significantly advance collaborations between academia and industry in developing curricular materials to bring green chemistry and sustainability into undergraduate and graduate education and to the current workforce. Topics such as systems thinking, educational module development, incorporating environmental justice into workforce training, and enabling tomorrow's workforce were explored...

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**Steam School is Back in Session**

## Chemical & Engineering News, American Chemical Society Publication

Top of the agenda at the World Petrochemical Conference were energy abatement and plastics circularity

### At big conference, petrochemical executives talk competitiveness and energy transition

<https://cen.acs.org/articles/101/i12/Top-agenda-World-Petrochemical-Conference.html>

by [Alexander H. Tullo](#)

April 10, 2023 | A version of this story appeared in [Volume 101, Issue 12](#)

Carbon emission considerations are indeed adding cost and complexity to chemical projects, said Mark Eramo, senior vice president for fuels, chemicals, and resource solutions at S&P Global Commodity Insights. When planning new projects, chemical companies have always had to consider variables such as access to energy and feedstocks, proximity to markets, and production technology. Executives must now consider “the carbon management strategies that need to be put in place,” Eramo said.

The industry is starting to come to terms with the price of carbon management. Eramo presented a case study of an integrated refinery and petrochemical complex that S&P modeled in the Middle East. A 16% increase in capital expenditures would be needed to achieve a 34% decrease in carbon emissions. The additional costs would reduce pretax profits from the complex by 39%. To offset this decline, the developer would require tax incentives or a “low-carbon” premium of about 9% on products made at the complex.

Dow CEO Jim Fitterling profiled a couple of his favored methods for reducing CO<sub>2</sub> emissions. One is carbon capture and storage (CCS). In Alberta, Dow is building the world’s first ethylene cracker to employ CCS to reach net-zero emissions. The recently passed Inflation Reduction Act and its incentives for CCS will create a wave of similar projects in the US, Fitterling predicted.

“The progress that we’ll make in the next decade, 2 decades, on hydrogen and carbon capture will be enormous in reducing CO<sub>2</sub> emissions,” he said.

Fitterling also wants to [bring back nuclear energy](#). In what might prove to be an industry first, Dow is working with X-energy to install one of that company’s modular nuclear reactors at a Dow facility on the US Gulf Coast to supply electricity and steam.

The Dow CEO finds nuclear power’s consistency appealing, especially compared with more intermittent sources of energy such as wind and solar.

## Chemical Engineering Progress Magazine, AIChE Publication Use Digital Tools to Meet Decarbonization Goals

[HTTPS://WWW.AICHE.ORG/RESOURCES/PUBLICATIONS/CEP/2023/DECEMBER/USE-DIGITAL-TOOLS-MEET-DECARBONIZATION-GOALS](https://www.aiche.org/resources/publications/cep/2023/december/use-digital-tools-meet-decarbonization-goals)

ENERGY, DECEMBER 2023

[TOMMY MITCHELL](#), [RAMON FARACH](#), [ROBERT SWIM](#)

**Extending digitalization initiatives to include decarbonization efforts can help chemical producers meet emission-reduction goals.**

Chemical producers are committing to achieving net-zero or carbon-neutral operations by 2050 as they face growing regulations and pressures to reduce their environmental impact (1). However, many producers are still in the early stages of their decarbonization journey and are unsure of where to start, what technologies they will need, and where they can make the most significant impact today. Fortunately, digital transformation efforts that are already underway to drive improvements in areas like yield, quality, and uptime can be extended into sustainability functions. In many cases, facilities in the chemical process industries (CPI) can use digitalization initiatives to simultaneously improve their production and sustainability performance.

Converting raw process data into actionable information, for example, can give producers greater insights into not only their asset performance and downtime but also their energy usage, waste, and emissions. Artificial intelligence (AI) can be harnessed to optimize the operational, energy, and material-usage efficiency of production processes.

Each chemical producer's efforts to reduce carbon emissions will be unique based on its industry segment, sustainability targets, and automation and digitalization maturity. But no matter what a producer's journey looks like, it will require some key foundational elements. This article discusses how companies can use real-time data, seamlessly connected systems, and digital technologies to improve process operations and efficiency...

## Chemical & Engineering News, American Chemical Society Publication

### World Chemical Outlook

### SEC may roll out final greenhouse gas reporting rule in 2024

<https://cen.acs.org/environment/climate-change/SEC-may-roll-final-greenhouse-gas-reporting-rule-in-2024/102/i2>

Dissent, potential legal challenges mean the rule requiring companies to publicly report emissions is uncertain by [Leigh Krietsch Boerner](#) January 19, 2024 | A version of this story appeared in [Volume 102, Issue 2](#)

Chemical companies are anxiously awaiting the final text of a rule from the US Securities and Exchange Commission (SEC) on greenhouse gas emission reporting. If finalized, the [rule would require](#) publicly traded firms to disclose greenhouse gas emissions to give investors a more complete picture of their financial condition.

The SEC initially proposed the rule in March 2022 but has postponed the publish date three times. Final action is now [scheduled for April 2024](#). The chemical industry is bristling at the rule, which some call regulatory overreach. "The SEC lacks the expertise and legal authority to drive climate information policy," [Charles Franklin](#), senior director for energy, climate, and environment at the American Chemistry Council, a trade group, says in a statement released in September.

Under the rule, the SEC would require companies to report direct emissions, indirect emissions from electricity and other forms of energy, and emissions along the companies' supply chains. This last provision, called scope 3, has ruffled the most feathers.

Critics point to the potentially high cost and difficulty of getting accurate emission data from suppliers. Supporters say that the SEC's cost-benefit analysis of adopting the rule is valid and that there is regulatory precedent for the rule.

These developments include other regional reporting requirements and possible legal challenges. Recently, [the European Union](#) and the [State of California](#) adopted reporting standards for greenhouse gas emissions, so companies operating in these areas may soon have to report what's required in the SEC proposal.

In June 2022, the [US Supreme Court ruled](#) that the Environmental Protection Agency lacks the authority to regulate greenhouse gas emissions. This decision may set a legal precedent for a similar lawsuit against the SEC if the reporting rule is adopted. Whatever the final decision, the outcome will shake up corporate reporting in the coming year.

## Chemical & Engineering News, American Chemical Society Publication

### World Chemical Outlook

<https://cen.acs.org/environment/persistent-pollutants/EPA-will-pick-up-the-pace-chemical-regulations-in-2024/102/i2>

### EPA will pick up the pace of chemical regulations in 2024

Bans on chrysotile asbestos and a few toxic solvents are likely this year

by [Britt E. Erickson](#) January 19, 2024 | A version of this story appeared in [Volume 102, Issue 2](#)

This year is shaping up to be one of the US Environmental Protection Agency's busiest for chemical regulation since the Toxic Substances Control Act (TSCA) was amended in 2016.

The agency is about 3 years behind schedule on issuing regulations on the first 10 high-priority chemicals assessed under the revised TSCA. The EPA found risks to human health for all 10. But so far, it has proposed rules to manage those risks for just half of them: [asbestos](#), [carbon tetrachloride](#), [methylene chloride](#), [perchloroethylene](#), and [trichloroethylene](#).

The EPA will likely finalize some of those rules and crank out proposals for the remaining 5 chemicals in 2024.

Asbestos will most likely be the first to be regulated this year. In early December, the EPA sent a rule banning the use of chrysotile asbestos to the White House Office of Management and Budget for review. This type of review, which is the final step in the rulemaking process, is supposed to take 90 days but often takes longer.

The final rule is likely to come out this spring, but the chlor-alkali industry won't phase out asbestos separation diaphragms for years. The three chlor-alkali companies that still use the carcinogenic substance—[Olin](#), [OxyChem](#), and Westlake Chemical—have all announced plans to transition away from it to membrane technology over the next several years.



## Chemical & Engineering News, American Chemical Society Publication

### World Chemical Outlook

#### Sustainable aviation fuel will power more planes

<https://cen.acs.org/energy/biofuels/Sustainable-aviation-fuel-will-power-more-planes/102/i2>

#### Expansion and new plants will boost SAF capacity by hundreds of millions of liters

by [Craig Bettenhausen](#) January 19, 2024 | A version of this story appeared in [Volume 102, Issue 2](#)

It's hard to decarbonize a passenger jet.

Planes can make gains through lighter-weight construction materials, better aerodynamics, and improved routes. But at the end of the day, you can't get around the fuel: global air travel consumes about [400 billion L of jet fuel per year](#), according to the market research firm S&P Global. In 2022, burning that fuel created 784 million metric tons of carbon dioxide emissions, according to [the International Energy Agency](#). That's 2–4% of total greenhouse gas emissions.

Most [airlines have committed to net-zero](#) greenhouse gas emissions by 2050 and plan to reach that goal by switching to sustainable aviation fuel (SAF). [SAF is chemically the same as regular jet fuel](#), but it's made from renewable, low-carbon raw materials instead of petroleum. Though hydrocarbon fuels are an imperfect way to fight climate change because they will always release CO<sub>2</sub> when burned, they're also the most plausible way to defossilize air travel on a large scale.

Airlines and government laboratories estimate that SAF can cut the net CO<sub>2</sub> emissions of a flight by [70 – 84%](#); academic research suggests that some SAF processes could yield [fuel that carries a net reduction](#) in atmospheric CO<sub>2</sub> even after it's burned (*ACS Sustainable Chem. Eng.* 2022, DOI: [10.1021/acssuschemeng.2c00977](#)). Airlines are eager to buy in to that appeal and have signed many advance purchase agreements for future SAF volumes.

## Chemical & Engineering News, American Chemical Society Publication

### World Chemical Outlook

#### Carbon sequestration wells will swell from a few to more than 40

<https://cen.acs.org/environment/greenhouse-gases/Carbon-sequestration-wells-will-swell-from-a-few-to-more-than-40/102/i2>

#### Many CO<sub>2</sub> sequestration sites will win permits in 2024 UN meetings' deals on plastics production could shake up industries

by [Craig Bettenhausen](#) January 19, 2024 | A version of this story appeared in [Volume 102, Issue 2](#)

For all the talk of carbon dioxide sequestration, not many sites today are injecting CO<sub>2</sub> underground for permanent storage. That's likely to change in 2024 as the US Environmental Protection Agency and other government bodies around the world approve a raft of permits for project developers eager to start storing CO<sub>2</sub>.

The EPA regulates CO<sub>2</sub> sequestration as part of its [authority over underground waste disposal](#) under the Safe Drinking Water Act of 1974. The approval needed to store the greenhouse gas is called a Class VI well permit. Classes I–V are for other types of gas and liquid waste.

The agriculture giant ADM has two Class VI permits, [the only ones issued by the EPA as of Jan. 12](#). Both are for its complex in Decatur, Illinois, where it injects CO<sub>2</sub> generated during ethanol production. The first was a demonstration project that buried about 1 million metric tons (t) of CO<sub>2</sub> total between 2011 and 2014. The other is still active and can sequester about 1 million t per year.

If the EPA keeps to [its current timeline estimates](#), its count will jump this year to 38 permitted wells at sites spread across the US Midwest, South, and West Coast. Though not all wells will begin injection right away, several are revving their engines at the starting line.

One example is a site owned by the ethanol maker Marquis Energy. The firm's plant in Hennepin, Illinois, sits over a sandstone formation capable of sequestering a total of more than 100 million t of CO<sub>2</sub>, according to Jennifer Aurandt-Pilgrim, Marquis's vice president of R&D.

"Next year at this time, we'll be sequestering 1.2 million t of CO<sub>2</sub> under the ground on our property," she said at a cleaning product industry meeting in September. "For every kilogram of ethanol I sell you, you're taking 0.3 kg of CO<sub>2</sub> out of the atmosphere."

Europe is the other big region for CO<sub>2</sub> sequestration projects. According to a database maintained by the nonprofit [Clean Air Task Force](#), the European Union has 3 active sequestration sites now, 3 under construction, and 97 more in various stages of development.

Climate change advocates emphasize that CO<sub>2</sub> injection wells are far from a stand-alone solution to climate change. In a briefing ahead of the recent 28th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP28), Mark Hertsgaard, executive director of the media education nonprofit Covering Climate Now, said, "As we talk about carbon capture and storage and carbon dioxide removal, there is no substitute to the first, second, and third order of business—which is to stop the emissions."

## Dayton Daily News, Newspaper

<https://www.daytondailynews.com/local/joby-aviation-recommended-for-500000-for-concorde-drive-manufacturing-plant/MERDJMIXHNEJ7BSTLZTHZTYKQM>

### Joby Aviation recommended for \$500K for Concorde Drive manufacturing plant

Company would get \$500,000 this year and \$500,000 next for first large-scale 'flying car' manufacturing site



LOCAL NEWS, By Thomas Gnau, Updated Dec 4, 2023

An advisory committee Monday recommended that Montgomery County commissioners approve \$500,000 now and \$500,000 next spring in development funds to persuade Joby Aviation to create a flying vehicle manufacturing operation near Dayton International Airport.

The site Joby is considering is 3571 Concorde Drive, but Veronica Morris, economic development director for the city of Dayton, said county funds would “follow” Joby if the company went to another Montgomery County location.

**Explore: ‘We’d like you to build it here.’ How Dayton and Ohio won Joby Aviation’s historic eVTOL plant**

Gwen Eberly, economic development and planning manager for Montgomery County, said 3571 Concorde, a former mail processing site, is the location Joby is focused on at the moment.

A spokeswoman for Joby said Monday afternoon the company had no new announcements to make.

Joby Aviation intends to build a manufacturing facility to make electric vertical takeoff and landing vehicles (eVTOL) — sometimes called “flying cars” — near Dayton International, having a facility operating by 2025.

Joby’s local employment could reach 2,000 workers, the state said in September, but recent Montgomery County documents indicate that closer to 1,200 jobs are expected, at least initially.

Morris said city of Dayton and Dayton Development Coalition officials will meet with Joby representatives for lunch in the Dayton area on Wednesday. She said she does not expect any formal action to take place.

Communities apply for county ED/GE development funding on behalf of companies moving to or expanding within Montgomery County. There are typically two application deadlines for a pair of funding rounds, in November and April.

The committee that met on Monday decides how much to recommend for each project. They can recommend that county commissioners approve the full amount for which municipalities apply, a partial amount — or they may recommend denying funding altogether.

In all, Montgomery County municipalities sought a combined \$3.08 million for projects that could create up to 1,830 new jobs and retain 120 more.

“A lot of great jobs are going to be created here,” said Chris Williams, assistant county administrator for business services for the county.

The committee’s recommendations will be presented to commissioners Dec. 12.

**NOTE:**

Through its subsidiary Aero Asahi, Toyota is working with Joby and the Japanese regulator JCAB to validate the FAA-type certification for the vehicle in Japan and make operations possible. Toyota also is Joby's largest shareholder with a \$400 million investment. April 27, 2023

Process Safety Fundamentals Chemical Process Safety is widely regarded as a vital and significant part of an overall Environment, Health and Safety Management System for chemical operations. We will briefly examine some recent process safety incidents which will help us understand the history and origins of chemical process safety. We will lay the groundwork for a comprehensive process safety management system for chemical operations.

**Session #1** – March 13, 2024, \$25/Person, at Cleveland Analytical, LLC; 15666 Snow Road, Brook Park, Ohio 44142  
In this session we will focus on what it means to understand our chemical processes. What information is critical, and how this information is the backbone of a robust process safety management system.

**Session #2** – March 20, 2024, \$25/Person, at Cleveland Analytical, LLC; 15666 Snow Road, Brook Park, Ohio 44142  
This session will build on what we learned in session #1. After understanding our processes, their hazards and their safe operating limits, we will focus on learning how to consistently operate and maintain our systems following documented procedures and standards. What are the essential elements of operation and maintenance.

**Session #3** – March 27, 2024, \$25/Person, at Cleveland Analytical, LLC; 15666 Snow Road, Brook Park, Ohio 44142  
In this session we will use what we learned in the previous two sessions combined and, using a practical perspective, study the core element of process safety: Management of Change. Time permitting, we will work on an example of how change is managed.

### Presenting:

Mr. Gurmukh Bhatia, CPSA, is President of RPSC, LLC a Risk & Process Safety Consulting services company. He retired as the Corporate Director for Process Safety and Chemical Security from The Sherwin-Williams Company, with over 45 years of work experience in the chemical industry. Mr. Bhatia is certified by the Board of Environmental, Health, and Safety (EHS) Auditor Certification (BEAC) as a Certified Process Safety Auditor (CPSA) with 15 years of auditing experience in Process Safety Management (PSM) regulated facilities. He is presently serving on the CLE AIChE Steering Committee as the Risk and Process Safety Director. Mr. Bhatia graduated from the Case Institute of Technology with a Bachelor's Degree in Chemical Engineering.



### Registration:

Please register with Joseph Yurko at [yurkojoe5@gmail.com](mailto:yurkojoe5@gmail.com) by March 5, 2024 for these events. The registration fee is \$25 for each seminar session. You may take one, two, or all three sessions. The registration fee will be paid at the door the day of the event with cash or check payable to AIChE Cleveland Section #017. The fee will include dinner and a CLE AIChE Professional Development Hour certificate for completing the event. Certificates will be awarded for each event, and if all three events are taken, then a fourth certificate will be awarded.

### Cleveland Analytical, LLC:

Our host is presently renovating their 2<sup>nd</sup> floor facility to install a lead analysis process to sample paint, dust, and soil samples from counties across Ohio to determine the amount of lead content. Samples with lead content above the acceptable levels will have third party companies notify residential, industry or brown field sites to undergo a site remediation process to remove the lead contamination and reduce the area lead content to acceptable levels for human and animal exposure. The central instrument to this effort that is being installed in their lab is an Inductively Coupled Plasma Optical Emission System (ICP-OES). A small test cell in this unit operates at 10,000<sup>o</sup>K (the same temperature as the surface of the Sun) to create the plasma energy of the sample that will indicate the concentration and amount of lead in the sample. This information will determine the level of contamination and the extent of remediation required to provide a safe and healthy environment for families to live, work and play in Ohio.

# CLE AIChE: Cleveland Chapter Fall 2023 – Spring 2024 Program Planning

(as of Jan 2024)

| Month                                  | Topic, Speaker  | Location   | AIChE Officer Responsible   |
|--|---|--|---|
| September 8, 2023<br>(Friday 6 PM)     | Oktoberfest Social Event  | German Central Farm, Parma                             | Joe Yurko, \$7/guest admission + \$ food & beverage?<br><a href="https://germancentralfoundation.com/oktoberfest">https://germancentralfoundation.com/oktoberfest</a>   |
| October 11, 2023<br>(Wednesday 6 PM)   | Brewery Tasting Tour  | Market Garden Brewery, OH City                         | Mike Galgoczy, \$20/guest with 20 guests.<br>Dinner: 7 PM Market Garden Brewpub & Restaurant.   |
| October 30, 2023<br>(Wednesday 5:30PM) | ASM Joint Meeting: Heat Treater's Night<br>H2 effect on heating metals, Justin Dzik, PE | FIVES North American Combustion, Inc., Talk & Tour     | Joe Spagnuolo & Joe Yurko: \$30 Non-members, \$15 Retirees, \$5 Students.<br><a href="https://www.fivesgroup.com/energy-combustion">https://www.fivesgroup.com/energy-combustion</a>  |
| November 14, 2023<br>(Tuesday 6 PM)    | History of ACS 7-National Chemical Landmarks Sites in Cleveland, Helen Mayer Speaking   | The Sanctuary, Rockside Road Independence, 44131       | Joe Yurko, Dinner menu ordering for professional members, Students cost: \$5<br><a href="http://places.singleplatform.com/shulas-steak-house-8?menu#menu_5599999">http://places.singleplatform.com/shulas-steak-house-8?menu#menu_5599999</a>     |
| December 7, 2023<br>(Thursday 6 PM)    | Nuclear Power an Introduction, Speaking: Andrew Obrablo                                 | The Sanctuary, Rockside Road Independence, 44131       | Joe Yurko, Dinner menu ordering for professional members, Students cost: \$5<br><a href="http://places.singleplatform.com/shulas-steak-house-8?menu#menu_5599999">http://places.singleplatform.com/shulas-steak-house-8?menu#menu_5599999</a>     |
| January 29, 2024<br>(Monday 6 PM)      | Chemical Process Safety Analysis, Speaking: Gurmukh Bhatia, CPSA                        | CCPL Independence 6361 Selig Drive Independence, 44131 | Joe Yurko, Dinner for professional member's cost: \$10, Students cost: \$5<br>CCPL Independence Branch: 216-447-0160, Menu: vote on recipe  |
| February 15, 2024<br>(Thursday 6 PM)   | Appalachian Regional Clean H2 Hub ARCH2 DOE Award, Andrew Thomas, JD, CSU               | The Sanctuary, Rockside Road Independence, 44131       | Joe Yurko, Dinner menu ordering for professional members, Students cost: \$5<br><a href="http://places.singleplatform.com/shulas-steak-house-8?menu#menu_5599999">http://places.singleplatform.com/shulas-steak-house-8?menu#menu_5599999</a>     |
| March 11, 2024                         | Safety Engineering in Oil Refining processes; Marianne Corrao Speaking                  | The Sanctuary, Rockside Road Independence, 44131       | Mike Galgoczy, Dinner menu ordering for professional members, Students cost: \$5<br><a href="http://places.singleplatform.com/shulas-steak-house-8?menu#menu_5599999">http://places.singleplatform.com/shulas-steak-house-8?menu#menu_5599999</a> |
| March 13, 20 & 27<br>Wednesday 6-8 pm  | Chemical Process Safety Analysis Seminars; Gurmukh Bhatia, CPSA                         | CCPL Independence 6361 Selig Drive Independence, 44131 | Joe Yurko, Dinner cost is included in the seminar expense. Seminar expense: TBA at a later time. Certificates will be awarded for each class as well as a final certificate.  |
| April, 2024                            | NEOSEF Awards Banquet Quantum Computer, Dr. Yu?   | CSU Washkewicz Hall, Rm 349                            | Joe Spagnuolo, Moderator NEOSEF Students, Prof. Nolan Holland, CSU ChE Lab Tours, \$15 members, Students Free   |
| May                                    | Cleveland Cliffs Steel Mill Tour, TBA   | CCPL Independence 6361 Selig Drive Independence, 44131 | Bruno Mancini, Joe Yurko, Dinner for professional member's cost: \$10, Students cost: \$5<br>CCPL Independence Branch: 216-447-0160, Menu: vote on recipe.  |

