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American Institute of Chemical Engineers, Cleveland Section

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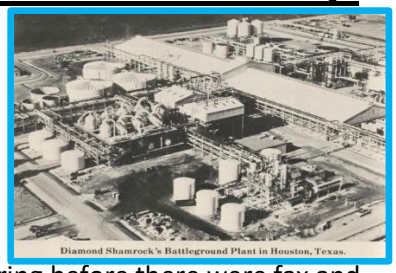
Dr. Fowler

Dr. Harvey

Thursday, February 27, 2025, 6:00 PM

AIChE Membership is Not Required to attend any meetings

”Diamond Shamrock Battleground Evaporator Startup with Fortran Simulation”



Diamond Shamrock's Battleground Plant in Houston, Texas.

The Sanctuary Restaurant, DoubleTree Hilton Hotel

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

ABSTRACT: Very few of us can remember those stone age days of chemical engineering before there were fax and Xerox machines, PC’s, cell phones, email, the internet and even Word, Excel and PowerPoint. Yet it was back in those very days of 1973 when two intrepid Chem E’s attempted to create a relatively sophisticated dynamic simulation for an extremely complex chemical plant essentially from scratch using Fortran IV. The plant was Diamond Shamrock’s new steam fired quadruple effect caustic evaporation plant (with a fifth flash effect) called Battleground in LaPorte, Texas. Steam flowed 1-2-3-4-flash, but the liquor flowed 1-3-4-2-flash with a centrifuge to remove precipitated salt at the second effect. There were PI level controllers on the 4 effects, a flow controller on the steam, and a PID concentration controller on the flash effect.

To our knowledge, no one had ever designed such a plant before back then, much less operated one. Would its operation be stable? Would it really produce the desired product—a 50% aqueous caustic solution from aqueous “cell liquor” containing about 10% caustic and 10% salt? Could it even be started? Exactly how? Diamond was rolling the multimillion $ dice on this plant, and we were to be the guarantors of a favorable roll.

The only two tools available for answering these questions were an IBM System/360 model 44 mainframe and Roger Franks’ textbook *Modeling and Simulation in Chemical Engineering*. There were no other suitable “canned” software packages available for use at the time. The IBM mainframe lived up well to its middle name but was clumsy at best and often problematic for engineering use. Franks’ textbook contained rudimentary software for numerical integration, convergence, stream mixing or splitting, etc., which guided our initial efforts but often failed from the stresses caused by the plant’s complexity.

The talk to be given by Bob Fowler and Don Harvey goes into some detail about the nature of the problem and goes into the history of how the available tools were employed in an attempt to answer those nagging questions posed by the new and complex chemical plant.

BIOGRAPHIES:

Dr. J. Robert Fowler received a BCHE from the University of Louisville and an MS in Biochemical Engineering and a PhD in Chemical Engineering, both from the University of Toledo. Dr. Fowler joined the Diamond Shamrock Chemicals Company as a Principle Advanced Applications Engineer in 1973. There Bob and a colleague, Dr. Donald J. Harvey, created a software package in Fortran IV that simulated the performance of the corporation's complex and advanced quadruple effect caustic evaporation plant which was under construction near Houston, TX. During a two-year period while construction continued, they created this dynamic simulator for startup and steady state performance purposes. The one-shift startup saved Diamond Shamrock an **estimated $60M** (1974) considering startup and construction costs. In 1986 when Diamond Shamrock was sold, Bob began work as a Senior Engineer at Sverdrup Technology as a Federal Contractor with the NASA Lewis Research Center in Cleveland, Ohio where he created a software package for physical properties of chemical fluids which is still used throughout NASA. In 1989, Bob was promoted to Director of Aerospace Technology with Sverdrup Technology/Nyma Corp. In 1999, he was appointed Program Manager with the Gilcrest Group, another Federal Contractor with NASA Glenn Research Center, where he turned around a contract for the engineering, operations, and maintenance of heavy equipment for aerospace testing including wind tunnels from a dysfunctional to an efficient operation. NASA HQ awarded the Gilcrest Group the prestigious "Minority Contractor of the Year" Award in Washington, D.C. for this and other services. At the conclusion of this contract Bob served as Vice President and general Manager for a small business supplying catalysts to the chemical industry. He retired from that position in 2004. He now serves volunteer positions as Chairman of the ADAMHS Board of Cuyahoga County and as Chairman of the ACS Cleveland Section's National Chemistry Week Program.

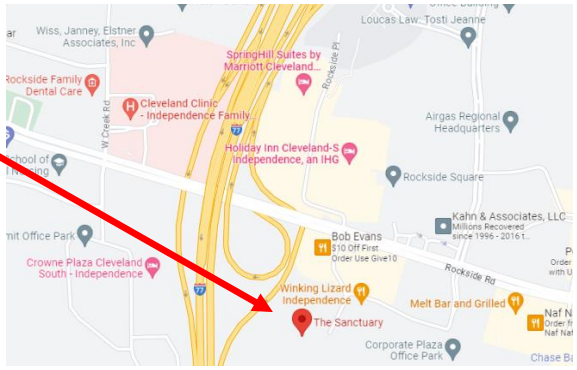
Dr. Donald J. Harvey received a BS in Chemical Engineering, MS in Mathematics, MS in Chemical Engineering, and a PhD in Chemical Engineering, all from the University of Michigan. Dr. Harvey joined Cleveland State University as an Assistant Professor in 1968. He taught nearly every course in the undergraduate chemical engineering curriculum (Material and Energy Balances, Thermodynamics, Transport I and II, Chemical Kinetics, Physical Chemistry, Unit Operations Lecture and Lab, Process Control, Numerical Methods) as well as graduate courses (Reactor Design, Engineering Thermodynamics, Dynamic Computer Simulation). While at CSU, Dr. Harvey developed a dynamic simulation of a quad-evaporative system for caustic production for the Diamond Shamrock Chemical Company, which then hired him away from CSU in 1977. In 1985, he moved from Diamond Shamrock to Lubrizol, where he worked on the simulation of kinetics and plant operations in their pilot plant. He stayed at Lubrizol until his retirement in 1996. He resides in Mentor, Ohio, with his wife of 59 years, Carol Harvey. In 2017 Dr. Harvey was recognized and honored with the Annual Bell Lectureship at the Cleveland State University by the Chemical and Biomedical Engineering Department Washkewicz College of Engineering.

For those attending this event, a Professional Development Hour Certificate (1 PDH) will be sent to you in the following days by Joe Yurko. In addition, any photos and the presentation from the evening will be posted onto the CLE AIChE Website as all other meeting photos and presentations are posted with the monthly newsletters.

Meeting Location: ***The Sanctuary Restaurant*** *(see map below)*

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

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-8/menu#menu_5599999

RSVP Required by Monday 24Feb2025 with Joseph Yurko and AIChE at: yurkojoe5@gmail.com

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January CLE AIChE Meeting at the Burntwood Tavern in Fairmont for a joint meeting with the Akron and CLE AIChE Sections, "Stark Area RTA Climate Action Plan 2027"

East Table CLE AIChE Section Members (L-R): Joe Spagnuolo, Vice Chair; Gary Peck, Secretary; Hal Kruger; Gurmukh Bhatia, Safety Chair; Valerie Congdon; and Mike Galgoczy, Chair

West Table Akron AIChE Section Members (L-R): Steve Flandro, Claude Flandro, Andrew Bachna, Ray Yurick, and CLE AIChE Section Members (L-R): Jeff Kopacka, and Dr. Joanne Belovich.

Founded by NSPE in 1951, EWeek(link is external) (February 16–22, 2025) is dedicated to ensuring a diverse and well-educated future engineering workforce by increasing understanding of and interest in engineering and technology careers.

Today, EWeek is a formal coalition of more than 70 engineering, education, and cultural societies, and more than 50 corporations and government agencies. Dedicated to raising public awareness of engineers' positive contributions to quality of life, EWeek promotes recognition among parents, teachers, and students of the importance of a technical education and a high level of math, science, and technology literacy, and motivates youth, to pursue engineering careers in order to provide a diverse and vigorous engineering workforce. Each year, EWeek reaches thousands of schools, businesses, and community groups across the U.S.

DiscoverE engineers share a common desire: to help grade school and high school students discover the exciting worlds of engineering and technology. Their goal is to relate practical applications of math, science, and engineering to the world around them. The information in this DiscoverE section will help you plan activities for Engineers Week or anytime you work with students.

Introduce a Girl to Engineering Day (Girl Day) helps focus a growing movement to inspire girls' futures so they learn they have a place in engineering a better world. In just one day you can make a difference by sharing your knowledge, experience, and some fun! Give girls the chance to think like an engineer and you'll be amazed at what you learn!

2025 Theme

The 2025 Engineers Week theme, *"Design Your Future,"* is both a call to action and a celebration of the limitless possibilities in engineering. It invites us to dream boldly, innovate relentlessly, and create a future shaped by our collective ingenuity.

As we mark 25 years into the 21st century, engineers remain at the forefront of addressing rapid technological advancements, societal shifts, and global challenges. Their critical work is reshaping how we live, work, and connect, with breakthroughs in:

- **Renewable Energy:** Advancing solar, wind, and geothermal systems to combat climate change.
- **Circular Economy:** Designing systems to minimize waste and promote sustainable production.
- **Artificial Intelligence (AI):** Revolutionizing industries like healthcare, transportation, and finance.
- **Autonomous Systems:** Innovating self-driving cars, drones, and robotics to transform industries.
- **Gene Editing:** Using tools like CRISPR to tackle genetic diseases and improve agriculture.
- **Urban Planning:** Creating smarter, sustainable cities with efficient energy and waste systems.

Learn more! Check out our recent blog post on how to incorporate this year's theme into your Engineers Week 2025 events and activities.

Chemical Engineering Progress, CEP, Magazine ARTICLE, January 2025 ISSUE
The American Institute of Chemical Engineers (AIChE)

Use of Distillation Simulation in Toll Manufacturing

Process Design and Development Section, Page 44
By: **Jeffrey L. Silverstein**
https://www.aiche.org/resources/publications/cep/2025/january/use-distillation-simulation-toll-manufacturing

Due to scheduling issues or lack of appropriate equipment, chemical companies often use the services of small toll manufacturers to generate products for customer trials or to meet unexpected product demand.

Toll distillation services were required by a client to upgrade the quality of one of its raw materials containing two closely boiling isomers. Since the reaction is carried out in a batch reactor, the mass of the batch could then be increased, the initial concentration of the reactant would be higher, and the batch reaction cycle time reduced to meet an unexpected demand for the final product. The client requires that the raw material not be identified. Henceforth, its principal components are designated as ISOM-1 and ISOM-2.

The reactant in the process is ISOM-1, which is purchased as a crude raw material nominally containing 78% ISOM-1 and 22% ISOM-2. The cost of the crude raw material was about $0.79/lb. The highest quality ISOM-1 commercially available was 95% ISOM-1 at a cost of about $2.57/lb. Purchasing high-quality ISOM-1 was not economically justifiable.

Consequently, a study was undertaken to technically and economically evaluate ways that the crude 78% ISOM-1 might be upgraded, using an outside toll distiller, to at least 96–98% ISOM-1 with minimal ISOM-1 loss in the bottoms stream.

This article describes the use of distillation simulation and process analysis techniques to guide the selection process for a distillation toller, develop the operating parameters for the distillation campaign, and provide day-to-day direction for the campaign to overcome unexpected timeline challenges caused by a delay in start-up, lower than anticipated column efficiency, a power outage, a pump seal failure, and underperformance of a rented cooling water chiller…

New Material Enables Carbon Capture at High Temperatures

Update Section, Page 10

https://www.aiche.org/resources/publications/cep/2025/january/cep-news-update/new-material-enables-carbon-capture-high-temperatures

A new material can capture carbon from waste streams as hot as 300°C, a potential step forward in decarbonizing industries such as cement and steel manufacturing.

Most carbon capture technologies in use or under study today can't operate at more than about 100°C. The aqueous amine technology that is most widely used is only functional at about 60°C or less. Many effluent streams are much hotter, meaning the only way to remove carbon at the source is to cool the streams first, a step that takes energy and money.

But a new metal-organic framework (MOF) could change that. The material, studded with zinc hydride sites to bind carbon dioxide, operates under high temperatures. In tests at 280°C, the MOF captured 90% of carbon from both high-concentration streams (20% CO_2, similar to waste streams in the iron and steel industries) and low-concentration streams (4% CO_2, similar to post-combustion streams in natural gas plants). The CO_2 reacts with the zinc hydride to generate formate.

"One of the main things that we learned here is that high-temperature gas capture is possible if you can use molecular reactivity in a porous material," says study senior author Jeffrey Long, a professor of chemistry at the Univ. of California, Berkeley.

UC Berkeley graduate student Rachel Rohde and postdoctoral fellow Kurtis Carsch led the experiments in Long's lab, which has long focused on MOFs for carbon capture. In 2022, the energy technology company Baker Hughes acquired Mosaic Materials, a start-up created by Long to commercialize a previous MOF that was well-suited to capturing CO_2 from low-purity waste streams…

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High Levels of Renewable Power Reduce the Intensity of Blackouts

Update Section, Page 12

https://www.aiche.org/resources/publications/cep/2025/january/cep-news-update/high-levels-renewable-power-reduce-intensity-blackouts

In February 2021, an extreme winter storm caused blackouts across Texas, cutting power to 4.5 million homes and contributing to at least 57 deaths. The public outrage that followed sparked the debate: Was it traditional fossil fuel generation that had fallen down on the job, or were newer renewable sources like wind to blame for failing at the critical moment?

As more and more energy grids turn to renewable sources of power, there have been increasing debates over whether renewable-heavy grids are more or less likely to fail in the face of extreme weather. A new study has gathered real-world data from 2001 to 2020 in the contiguous 48 states and finds that renewables actually provide a boost in resilience.

Blackouts in renewable-heavy grids tend to be less intense, the new study finds. Extreme weather can cripple any grid, but grids that rely heavily on renewable sources are not more vulnerable to blackouts than fossil-fuel-reliant grids. When blackouts do occur, they are briefer, affect fewer customers, and fall less short of meeting demand than blackouts on grids with fewer renewables.

“Renewable energy is doing more than we expected,” says study co-author Fangxing Li, an electrical engineer and professor at the Univ. of Tennessee.

Li and his colleagues studied 2,156 blackout events from 378 municipalities over two decades. They categorized renewables (solar and wind) penetration into the energy grids at each event, ranging from the lowest (RES1) at 0–10%, to the highest (RES4) at 30–40%. After normalizing the data by each grid’s annual electrical customers and annual demand, they compared blackout events by intensity — as defined by customers affected — duration of blackout, and how far short of meeting demand the grids fell. They also gathered historical weather data on humidity, wind speed, temperature, and irradiance, a measure of solar intensity…

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Safety Considerations in the Design of Small Systems

Safety Section, Page 30

By: **Grant Girouard**, **Pratik Bhishikar**

https://www.aiche.org/resources/publications/cep/2025/january/safety-considerations-design-small-systems

Small-scale laboratory systems and pilot plants present unique challenges in process safety. This article offers strategies to overcome these difficulties while prioritizing a robust safety culture.

Lab-scale systems and pilot plants are integral to developing, understanding, scaling up, and de-risking novel chemical process technologies. Despite this important role, these plants do not generate operating revenue. Therefore, when designing these units, using existing equipment and infrastructure is often a goal. This provides flexibility in operation and reusability and serves as a cost-effective asset to the owner.

Ensuring safety in the design and operation of lab-scale systems and pilot plants is as crucial at these smaller scales as it is for production-scale plants. Because smaller-scale plants typically run novel processes that are not fully understood, they are often designed for maximum flexibility, further compounding the importance of safety. This article highlights aspects of the safe design of lab-scale systems and pilot plants that are often overlooked *(1)*.

Challenges in electrical hazardous area classification

Hazardous area classification is a critical safety aspect that involves identifying and categorizing areas where potentially explosive atmospheres may be present. Despite the ubiquity of this practice, it can be challenging at smaller scales for several reasons, including limited physical space, lack of equipment at smaller throughputs, unique process hazards of novel chemistries, and the constant modification of these units to adapt to new uses. Two scenarios that warrant particular attention are processes that handle materials that are both flammable and toxic, and processes that use fired or very hot equipment…

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Autothermal Reformer-Based Ammonia Production

Safety, Page 37; By: **Bernd Mielke**, **Klaus Nölker**

https://www.aiche.org/resources/publications/cep/2025/january/autothermal-reformer-based-ammonia-production

A relatively new way of producing hydrogen using autothermal reforming makes carbon capture easier for blue ammonia production.

Ammonia production via autothermal reforming (ATR) of natural gas is a process that allows for larger reductions of carbon dioxide emissions compared to the more traditional steam reforming process, which involves a primary and secondary reformer. In an ATR process, most of the CO_2 emissions are concentrated in one single stream, which can be sent to sequestration.

In the ammonia industry, there are some reservations against ATR. Chiefly, as opposed to traditional steam methane reforming (SMR), oxygen is added to the ATR reactors to raise the temperature of internal combustion, which provides the energy required to reform the natural gas feed. The oxygen stream presents a potential hazard to the ammonia plant. However, in the methanol industry, the use of oxygen is a well-accepted practice.

This article discusses the lessons that one company's engineers learned while developing an ATR-based ammonia plant. Through knowledge transfer from a methanol plant design, the proper mechanical design of the ammonia plant (including piping) and the safety systems around the ATR unit were established, which emphasized the safe handling of oxygen. This article also covers how to determine the boundaries of carbon intensity calculations — considering the plant alone (Scope 1) or including the utility supply (Scope 2) — and the impact of such boundaries on the plant's design…

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A Message From 2025 AIChE President Joseph D. Smith: It's Great to be a Chemical Engineer in 2025

Institute News, Page 54

https://www.aiche.org/resources/publications/cep/2025/january/institute-news-january-2025

Welcome to another new year. We live in an amazing time where space travel has become routine, fusion reactors are more than a dream, and new biomedical technologies are improving our quality of life. It's great to be a chemical engineer in 2025. I am excited to lead AIChE as its President during the coming year.

The theme of the AIChE Foundation's recent Gala (see article, p. 55) was "inspiring the power of good." We can achieve this by cultivating and engaging a fully inclusive workforce, built by the diverse and talented professionals who are playing key roles in addressing today's global challenges — such as energy poverty and climate change. AIChE's IDEAL (Inclusion, Diversity, Equity, Anti-racism, Learning) principles enable us to attract and retain the best and brightest within the chemical engineering profession. "Inspiring the power of good" empowers us to build and navigate our future…

Lead pollution in the air impacted all ancient Romans

Evidence from ice cores shows widespread lead pollution that may have caused IQ decline throughout the empire

Science Concentrates Section, Page 5

by Prachi Patel
https://cen.acs.org/analytical-chemistry/Lead-pollution-air-impacted-ancient/103/web/2025/01

Ancient Rome thrived during the 200 years of peace known as Pax Romana, which occurred over the first and second centuries of the Common Era. But an unknown enemy poisoned nearly everyone in the empire. Lead air pollution spiked during this time and resulted in elevated blood lead levels and cognitive decline, a new study shows (*Proc. Natl. Acad. Sci.* 2024, DOI: 10.1073/pnas.2419630121).

Ancient Romans used lead in water pipes, utensils, and cosmetics. They even used it to sweeten wine. Those uses affected the elite in cities. But the rural majority was exposed to lead emissions from the smelting of lead-silver ores to make silver coins, says Joseph R. McConnell, a climate and environmental scientist at the Desert Research Institute. He and colleagues wanted to measure lead pollution across Europe and its consequences for health. “Our goal was to measure lead exposure for everybody,” he says.

The researchers first took measurements of lead deposited in three Arctic ice cores every year between 500 BCE and 600 CE using techniques they have reported before. They found that lead emissions shot up around 15 BCE, soon after the rise of the Roman Empire, and dipped around 165–180 CE with the end of Pax Romana.

The scientists then used atmospheric models to estimate that the Arctic deposits resulted from lead concentrations in air of about 150 ng/m^3 near known Roman mining and metallurgy sites, the main sources of lead pollution in the world at the time. That in turn led to average lead concentrations of over 1.0 ng/m^3 in the atmosphere above Europe. Finally, the team used modern epidemiological methods to translate those air concentrations to blood lead levels in children of about 2.4 µg/dl, which most likely resulted in a 2.5–3 point reduction in IQ. Today, levels below 1 µg/dl are considered safe…

Chemical & Engineering News, C&EN Magazine ARTICLE, January 13, 2025 ISSUE
The American Chemical Society (ACS)

US finalizes 45V clean hydrogen subsidy scheme

Final rules retain strict renewable energy requirements but extend phase-in period

Policy Concentrates Section: Page 13
by Craig Bettenhausen
https://cen.acs.org/energy/hydrogen-power/US-finalizes-45V-clean-hydrogen/103/web/2025/01

The US Department of the Treasury's final rules for hydrogen production credits under section 45V of the federal tax code are generating reactions from industry and environmental groups. The 45V program, part of the Inflation Reduction Act of 2022, offers a tax credit for hydrogen if the total greenhouse gas (GHG) generated in its production is less than or equal to 4 kg of carbon dioxide per 1 kg of hydrogen.

That simple benchmark sits on top of almost 400 pages detailing what hydrogen producers have to demonstrate to qualify for the tax credit, which can be worth up to $3 per kilogram. The Treasury released the rules on Jan 3. Compared with a draft published in late 2023, the final rules give producers more time to get their technologies and feedstocks into compliance. They retain tough requirements meant to ensure that electrolytic hydrogen production doesn't just take renewable energy from other uses.

The rules won measured praise from both environmental groups and industry. "We appreciate Treasury moving toward better hydrogen policy in its final rule for clean hydrogen production," Conrad Schneider, a senior director at the Clean Air Task Force (CATF), an environmental group, says in a statement. "Hydrogen production must be decarbonized across the supply chain, 99% of which currently uses highly polluting fossil-fuel-based production."

In a statement, Kim Hedegaard, a cleantech executive at the chemical process technology firm Topsoe, calls the final guidance "a critical milestone in growing the clean hydrogen economy in the US. With this added clarity, many projects that have been delayed may move forward, which can help unlock billions of dollars in investments across the country." Topsoe is building a $400 million factory in Virginia that will make solid oxide electrolyzer cells for electrolytic hydrogen production.

A strong US economy should spur chemicals

The slumping sector is expected to get a jolt this year from lower interest rates

by *Alexander H. Tullo* , Page 18
https://cen.acs.org/business/economy/A-strong-US-economy-should-spur-chemicals/103/i1

Despite a robust US economy, weak spots such as manufacturing and construction have put the country's chemical enterprise in a slump. That scenario should start to change this year as lower interest rates percolate through the economy. Longer term, the US industry is in a good competitive position, but possible tariffs from the incoming administration of Donald J. Trump pose a risk.

"On the eve of a change in government, the US economy is in a good place," Goldman Sachs says in its US economic outlook. Inflation is falling back toward a normal rate of about 2%, and worries about a recession are fading. The investment bank says the US economy grew 2.8% in 2024, and it forecasts an increase of 2.5% in 2025.

The American Chemistry Council (ACC) estimates economic growth of 2.7% for 2024 and projects 2.0% growth in 2025. The trade group estimates that US chemical output, excluding pharmaceuticals, declined by 0.4% in 2024, but it expects growth to resume at a 1.9% rate in 2025.

Related: Trade group expects US chemical turnaround

"The industrial sector, which of course is where chemicals play, remains pretty stagnant," Martha Moore, the ACC's chief economist, told reporters last month.

An exception has been the electronic materials sector, where business is booming because of construction of data centers and semiconductor fabrication plants. The consulting firm Gartner looks for global semiconductor sales to jump 14% in 2025, to $717 billion, after a 19% surge in 2024. The ACC forecasts that sales of chemicals used in electronics will grow 8% in 2025…

Chemical & Engineering News, C&EN Magazine ARTICLE, January 13, 2025 ISSUE
The American Chemical Society (ACS)

Hydrogen project decisions will hinge on power source

Growing acceptance and availability of CO_2 storage will favor blue over green H_2 in most locations

by *Craig Bettenhausen*, Page 25
https://cen.acs.org/energy/hydrogen-power/Hydrogen-project-decisions-will-hinge-on-power-source/103/i1

Hydrogen made by splitting water using renewable electricity, colloquially referred to as green H_2, has enjoyed several years of prominence because of the clear carbon-free story it can tell.

But that story changed in 2024 as environmental advocates and policymakers dug into the details of how H_2 projects connected to the electrical grid affect the amount of fossil fuels burned for energy. The response was concepts such as additionality and time correlation that aim to make sure utilities supply green H_2 projects with new renewable energy rather than sell their existing green energy to H_2 producers and then crank up fossil fuel–fired power plants to cover other customers.

Such rules are becoming a feature in subsidy and mandate schemes, and complying with them will increase the cost of green H_2, analysts and investors say. At the same time, carbon capture and sequestration (CCS) is gaining regulatory acceptance as a way to lower the greenhouse gas footprint of conventional fossil fuel–based hydrogen, a provenance that gives it the moniker blue H_2.

In 2025, it's likely that areas where CCS infrastructure is either active, such as Illinois, or coming soon, such as Northern Europe, will see accelerated investment in blue H_2. Areas that have a low-carbon electrical grid, such as France and the US Pacific Northwest, should see investment in green H_2 projects...

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The American Chemical Society (ACS)

Chemical makers will compete with data centers for low-carbon energy

Both industries are exploring ways to use fossil-free energy sources to guarantee 24/7 electricity

by Matt Blois, Page 26

https://cen.acs.org/energy/Chemical-makers-will-compete-with-data-centers-for-low-carbon-energy/103/i1

Chemical manufacturers are trying to decarbonize their electricity supply by purchasing or generating their own low-carbon energy. But they must increasingly compete with technology firms scooping up fossil-free electricity to power an explosion of new data centers.

Nearly two-thirds of chemical firms have plans to eliminate greenhouse gas emissions from their electricity consumption, according to the consulting firm Accenture. Yuan-Sheng Yu, a chemical industry analyst with Lux Research, says most companies are moving toward those goals with power purchase agreements (PPAs): deals in which they agree to buy electricity from a new renewable energy project. In some cases, these projects are directly connected to chemical plants; in others, the power is sent to the public grid and the PPA purchaser claims that power as part of its electricity mix.

The number of PPAs in the chemical industry has risen quickly over the past several years. Orica, BASF, LyondellBasell Industries, and DSM-Firmenich all signed PPAs in 2022. Air Liquide nearly doubled its purchases of renewable electricity in 2023, mostly through PPAs, according to the firm's 2023 annual report.

Many tech companies are pursuing similar agreements to power their data centers, making the market for PPA very tight. The chemical firm Sasol hoped to decarbonize electricity for its US operations with PPAs but is now exploring other options because PPA prices have risen. Yu expects that the growing demand for the agreements will incentivize companies to build more renewable energy projects. "As people start fighting over PPA supply, that's a good thing for the solar and wind industry," he says.

In its 2023 climate report, BASF calls PPAs a temporary measure and says it ultimately aims to produce its own low-carbon electricity. The firm announced last year that it would acquire part of a huge offshore wind farm and that it's investigating the possibility of using geothermal power at a site in Germany. Meanwhile, Dow hopes to power a chemical plant in Texas with small nuclear reactors from X-energy, the same company that Amazon is tapping to generate electricity for its data centers…

Chemical & Engineering News, C&EN Magazine ARTICLE, January 13, 2025 ISSUE
The American Chemical Society (ACS)

Will EPA continue to allow problematic pesticides?

Agency to decide in 2025 whether neurotoxic insecticides and a drift-prone herbicide stay or go

by *Britt E. Erickson* , Page 37

https://cen.acs.org/business/Will-EPA-continue-to-allow-problematic-pesticides/103/i1#:~:text=Takeaways,genetically%20modified%20soybeans%20and%20cotton.

The US Environmental Protection Agency is slated to decide this year whether several controversial pesticides can stay on the market. The agency has been reevaluating the safety of the chemicals in response to court orders and as part of a routine process called registration review that happens every 15 years for pesticides sold in the US.

Here are three of the high-profile pesticides that C&EN will be watching in 2025.

Chlorpyrifos

The organophosphate insecticide chlorpyrifos has been in the EPA's crosshairs for years because of the chemical's adverse neurodevelopmental effects in children. The agency proposed banning it twice under Barack Obama's administration. It then reversed course and denied a petition to ban the pesticide in April 2017 under Donald J. Trump's first administration. After several court cases, the EPA finalized a ban on chlorpyrifos in 2021 under Joe Biden's administration. But the US Court of Appeals for the Eighth Circuit overturned that ban in 2023. In response to the court ruling, the EPA banned the use of chlorpyrifos on all but 11 crops in late 2024. As part of the registration review process, the agency plans to issue a proposed decision this year on whether the insecticide can remain on the market, followed by a final decision in 2026.

Neonicotinoids

Neonicotinoids, a class of insecticides blamed for harming bees and other pollinators more than a decade ago, will likely garner renewed attention this year. The EPA is planning to decide whether to reapprove five of them: acetamiprid, clothianidin, dinotefuran, imidacloprid, and thiamethoxam. Environmental groups say studies in rodents suggest neonicotinoids are harmful to the developing mammalian brain, including the brains of human children. The insecticides were once hailed as safer alternatives to organophosphates. But in a recent review article published in *Frontiers in Toxicology*, scientists at the Natural Resources Defense Council and the Center for Biological Diversity, two environmental groups, say neonicotinoid makers unduly influenced the EPA's approval process (2024, DOI: 10.3389/ftox.2024.1438890). The EPA's exposure limits for neonicotinoids are not supported by the toxicology data submitted by the companies, the groups say…

Chemical & Engineering News, C&EN Magazine ARTICLE, January 13, 2025 ISSUE
The American Chemical Society (ACS)

The vanishing violet in van Gogh's Irises

X-ray fluorescence studies help scientists and conservators re-create the original hues in this famous painting

by *Bethany Halford*, Page 32

https://cen.acs.org/analytical-chemistry/art-&-artifacts/vanishing-violet-van-Goghs-Irises/102/web/2024/12

On May 8, 1889, painter Vincent van Gogh checked himself into a psychiatric hospital near Saint-Rémy-de-Provence, France, during a major mental health crisis. The hospital director, Théophile Peyron, allowed van Gogh to bring his paints, and he even set aside studio space for the artist, hoping that painting the natural beauty in the hospital's surroundings would help van Gogh with his recovery. In a letter to his brother Theo van Gogh dated May 9, the artist wrote that he had begun painting the "violet irises" that grow on the parklike hospital grounds.

Violet. It's a small but revealing detail. Anyone who has ever seen one of van Gogh's studies of the flowers—either in person or as one of the many reproductions that appear on posters, tote bags, dresses, and blank books—will tell you that the irises in these paintings look blue. But the irises on the grounds of the hospital in Saint-Rémy-de-Provence, which have changed little in the past 135 years, are a vivid violet.

What has given van Gogh's irises the blues?

That's the question at the heart of *Ultra-Violet: New Light on Van Gogh's Irises*, an exhibition that opened at the J. Paul Getty Museum in Los Angeles on Oct. 1 and runs through Jan. 19, 2025. The exhibition details a study that Getty scientists and conservators began in 2020 of what is probably van Gogh's most famous version of *Irises*.

"One of the challenges with *Irises* as a subject of study is that it's one of the most popular paintings in our collection, and it is literally always on view. So it's difficult to get it off of the wall and into the lab or into the conservation studio," says Catherine Patterson, a chemist who works at the Getty Conservation Institute.

But in 2020, as the museum closed its doors to visitors because of the COVID-19 pandemic, Getty researchers realized they had an opportunity to study the painting in way they had never been able to before—even as they donned masks and kept socially distant from one another. "This project really was one of those silver linings of the pandemic era, if only because the museum had to close," Patterson says.

Patterson and her colleagues' study of the painting revealed what many have long suspected: a light-sensitive paint van Gogh used called geranium lake has degraded over the years, removing the red color that he mixed with blue to achieve violet…

CLE AIChE: Cleveland Chapter

Fall 2024 – Spring 2025 Program Planning

(as of Feb2025)

Month	Topic, Speaker	Location	AIChE Officer Responsible
September 7, 2024 (6 PM)	Oktoberfest Social Event	German Central Farm, Parma	Joe Yurko, $7/guest admission + $ food & beverage free for CSU AIChE students. https://germancentralfoundation.com/oktoberfest
September 11, 2024 (Wednesday 2:30 – 3:30 PM)	Dr. Yu, CSU, IEEE Quantum Computer	CSU, Engineering CSU AIChE & IEEE Students	Joe Yurko & Dr. Gatica, Dr. Holland, Members: $10; Students: Free CLE AIChE: Pizzas & Beverages
October 10, 2024 (Thurs. 6 PM)	M.W. Wilson Company Steam Safety Class & Tour	M.W. Wilson Company 2579 Center Road Hinckley, OH 44233	Joe Yurko, Jeff Wilson, Dinner provided by M.W. Wilson Co.? M.W. Wilson Co.: 330-225-0663 https://www.wmsilsoncoinc.com .
October 2024 (6 PM) Wed. 16Oct2024 Wed. 30Oct2024 Wed. 06Nov2024	Chemical Process Safety Analysis Seminars: by Gurmukh Bhatia, CPSA	Strongsville Fire Dept. Ward 1 Community Rm 11297 Webster Road, Strongsville, OH 44136	Joe Yurko, Dinner cost is included in the seminar expense. Seminar expense: $25 per session with a total of 3 sessions. Certificates will be awarded for each class as well as a final certificate. sfd: 440-580-3210:
November 13, 2024 Wednesday (4:00 – 6:00 PM)	Benjamin A. Horwitz "Portrait of a Chemical Engineer" Career Discussion with students and professionals	CSU AIChE Section Joint Meeting, Washkewicz College of Engineering AIChE Chap	Joe Yurko, Dr. Gatica, Dr. Holland, CLE AIChE Meals: Professional members: $10; Students: Free CLE AIChE: Pizzas & Beverages
December 17, 2024 (6 PM)	Nuclear Power Accident Analysis. Speaking: Andrew Ohrablo. Vistra Life Cycle Manag. Fleet Engineer	The Sanctuary, Rockside Road Independence, 44131	Joe Yurko, Dinner menu ordering for professional members; Students cost: $5 http://places.singleplatform.com/shulas-steak-house-8/menu#menu_5599999
January 28, 2025 (6 PM)	SARTA Hydrogen Fuel Cell Bus Fleet Expansion Funding from DOE ARCH2 Award, Kirt Conrad CEO	Burntwood Tavern Fairlawn, Akron Rt.18 and I-77	Joe Yurko, Dinner menu $28 ordering for professional members; Students cost: $5 Lobster Bisque Soup or House Salad Salmon Salad, or Angus Burger, or Fish & Chips
February 27, 2025 (6 PM ?)	1976 Diamond Shamrock plant Fortran Simulation Startup. Speaking: Dr. James Fowler & Dr. Don Harvey	The Sanctuary, Rockside Road Independence, 44131	Joe Yurko, Dinner menu ordering for professional members; Students cost: $5 http://places.singleplatform.com/shulas-steak-house-8/menu#menu_5599999
March 26, 2025 at CWRU and / or April 2, 2025 at CSU	Benjamin A. Horwitz "The Good, The Bad, & The Ugly" Chemical Process Simulation with process solutions and workshop	TBA: CWRU Student AIChE and / or CSU Student AIChE	Mike Galgoczy & Joe Yurko: TBA AIChE Students to bring their PCs for workshop with simulation case studies CLE AIChE members need not bring PCs to follow simulation case studies
April 2025 (6 PM)	NEOSEF Awards Banquet	CCPL Branch Library Parma?	Joe Spagnuolo, Moderator NEOSEF Students, CCPL Branch Library Dinner: Pizza, professional members: $10; Students: Free
May 20, 2025 Tuesday (3 PM)	Tour of Perry Nuclear Power Plant Reactor Simulator?	Perry Nuclear Power Plant Training Tour: 18 visitors	Ray Zucker, Joe Yurko and Mandy Nagle (Vistra, Communications)

In person events -- Remote meetings if non-contact required / COMPLETED MEETING / PLANNED MEETING / PROPOSED MEETING

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