

SUMMER 2024

ENERGY@SCALE

A PUBLICATION OF UH ENERGY

THE NEXT GENERATION OF ENERGY LEADERS

Students from majors across UH are preparing for cutting-edge careers in the energy sector.

RESEARCH EXCELLENCE

Learn how UH is leading the clean energy transition.

STUDENT SUCCESS

Meet the UH students tackling the global plastics problem.





Welcome



This is a transformational time for the global energy ecosystem. Driven by unprecedented innovation, collaboration and opportunity, we're ready to meet the growing global demand for energy through a more sustainable future. It's my pleasure to introduce you to the inaugural issue of *Energy@Scale*, a University of Houston Energy publication dedicated to exploring this transformative journey.

As we stand on the cusp of profound change, we are collectively working to address the energy trilemma: How can we ensure access to energy that is affordable, secure and reliable and environmentally responsible for everyone? UH Energy is dedicated to finding innovative answers to these crucial questions.

We invite you to explore the pages of *Energy@Scale*, where we highlight research excellence, student success and thought leadership. In this publication, you will learn about cutting-edge UH research in the hydrogen space, including a proposal to transform existing energy infrastructure in the Gulf of Mexico to produce clean energy.

We showcase how we prepare our students to be critical thinkers and innovators through mentorship, experiential learning opportunities and collaborative research initiatives. "Youthful Energy" takes a deep dive into how UH Energy nurtures tomorrow's energy leaders from an array of majors. Alumna Kamalpreet Kaur shares her journey from being someone who didn't imagine an energy career to someone who helps drive low carbon solutions. We also introduce you to a team of undergraduate business students ready to take a UH-developed global plastics patent to market.

It is crucial to harness the collective strengths of academia, industry and innovation hubs distinctive to Houston and the region. If you want to share an idea or partner with UH Energy, please reach out to me. Together we can go further.

Warm regards,

Ramanan Krishnamoorti

Vice President for Energy and Innovation
University of Houston



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Leading the Clean Energy Charge

U.S. Department of Energy funds groundbreaking UH Energy research projects.

BY KATIE STROH

There is no question that hydrogen could be a game changer. As a viable replacement to existing liquid carbon-based fuels, it has the potential to reduce emissions in some of the most difficult-to-decarbonize sectors — manufacturing, agriculture, supply chains and long-haul transportation, for example. But there are plenty of questions about *how* to make it happen.

The University of Houston, The Energy University, is bringing transformational ideas to the table that seek to turn existing oil and gas infrastructure into sources for low-carbon energy. Perhaps just as important, it's pursuing solutions that won't cripple the Gulf of Mexico oil and gas industry activities or decimate its workforce.



Ram Seetharam

A New Approach for Decommissioning Infrastructure

Ram Seetharam, a UH alumnus and retired senior executive of ExxonMobil, is a UH researcher heading up one such project: A Comprehensive Roadmap for Repurposing Offshore Infrastructure for Clean Energy Projects in the Gulf of Mexico. The

research team envisions ways to prolong the use of existing oil and gas assets — more than 1,500 oil platforms, 14,000 wells and 10,000 miles of pipeline — that have a typical lifespan of up to 40 years.

When their time is up, the law dictates these assets must be shut down and decommissioned, which is a lengthy, expensive process. Seetharam believes the life of this infrastructure can be extended — with minimal environmental impact — by installing wind turbines that generate clean energy, as an example.

“Not only are you creating new jobs, but you’re also helping the transition from oil and gas to clean energy, reusing the structures, helping decommissioning happen in a more organized fashion and hopefully generating some profit,” Seetharam says.

Project members also hope to bring together a broad coalition of outside stakeholders — expert advisers from regulatory bodies, community agencies, other research institutions, national labs and more — to install and operate a small demonstration project in the Gulf to test the concept.

“The vision is that if even a fraction — 10 to 15% — of existing platforms are converted to clean energy projects from offshore oil and gas, you keep the Gulf of Mexico energy community alive and thriving past the transition away from oil and gas,” Seetharam says.

The U.S. Department of Energy recently announced \$17.4 million in funding for 19 novel, early-stage research projects focused on expanding clean energy technologies at colleges and universities across the country. UH is involved in three of the funded projects.

“For the University, having our name on that demonstration project and using that as a platform to allow students to have meaningful experiences designing, running and operating these kinds of clean energy projects can be a huge addition to classroom-based learning,” Seetharam says.

One of the UH projects funded by the Department of Energy aims to repurpose existing oil and gas assets in the Gulf of Mexico for clean energy use.





Another Department of Energy-funded UH project hopes to bring hydrogen refueling stations for EVs to the Houston area by repurposing existing fueling stations.



Christine Ehlig-Economides

Expanding Access to Charging Stations

Also funded by the DOE is the Houston Hydrogen Transportation Pilot led by Christine Ehlig-Economides, professor and Hugh Roy and Lillie Cranz Cullen Distinguished University Chair of Petroleum Engineering. Her research team is exploring the possibility of bringing hydrogen

refueling stations for electric vehicles to the Houston area by repurposing existing fueling stations as well as methane pipelines to transport the hydrogen.

Although standard charging stations for battery electric vehicles are common nationwide, commercial fueling stations for hydrogen-fueled vehicles (also considered EVs) don't exist outside of California.

"The Houston area has most of the hydrogen generation in the country, so we should be able to tap into that," Ehlig-Economides says. She believes the simplicity and ultrafast fueling capabilities of hydrogen-fueled vehicles may appeal to consumers as well as corporations and government entities that use delivery and fleet vehicles, such as the U.S. Postal Service.

"Hydrogen refueling is quick, like gasoline or diesel," Ehlig-Economides says. "And EVs are much simpler vehicles: They have 2,000 parts. Vehicles that use gas and diesel have 20,000 parts, so there are 10 times as many things that can go wrong. Consumers might find a lot of value in being able to refuel with hydrogen."

The funding allows project leaders to assemble a group of

stakeholders — vehicle makers, hydrogen producers and more — to organize and participate in a pilot project, potentially testing hydrogen refueling with a group of delivery or fleet vehicles. Ehlig-Economides and her team are also partnering with Prairie View A&M to explore the environmental and social risks of implementing the pilot, and with UH's Hobby School of Public Affairs to analyze community benefits and costs.

The refueling project is being managed by Joe Powell, founding executive director of the UH Energy Transition Institute. Stanko Brankovic, professor of electrical and computer engineering at UH, and Raghava Kommalapati, Honeywell Endowed Professor at Prairie View A&M, are co-principal investigators on the project.

UH Is Leading the Energy Transition

While UH is already considered a major player in hydrogen energy research, Ehlig-Economides says she's excited to see the ways this DOE funding will spawn new research opportunities for faculty and student researchers alike.

Ramanan Krishnamoorti, UH vice president for energy and innovation, agrees, adding that UH is uniquely positioned due to its location, the breadth of its expertise and energy research, and its established industry collaborations.

"The success of these projects could attract investment, create jobs, produce clean energy, save costs, reduce carbon emissions and benefit not only the greater Houston area but the Gulf Coast and beyond," he says.

The DOE selected the projects through its University Training and Research program, which aims to educate and train future engineers and scientists dedicated to achieving a net-zero emissions economy by 2050. 

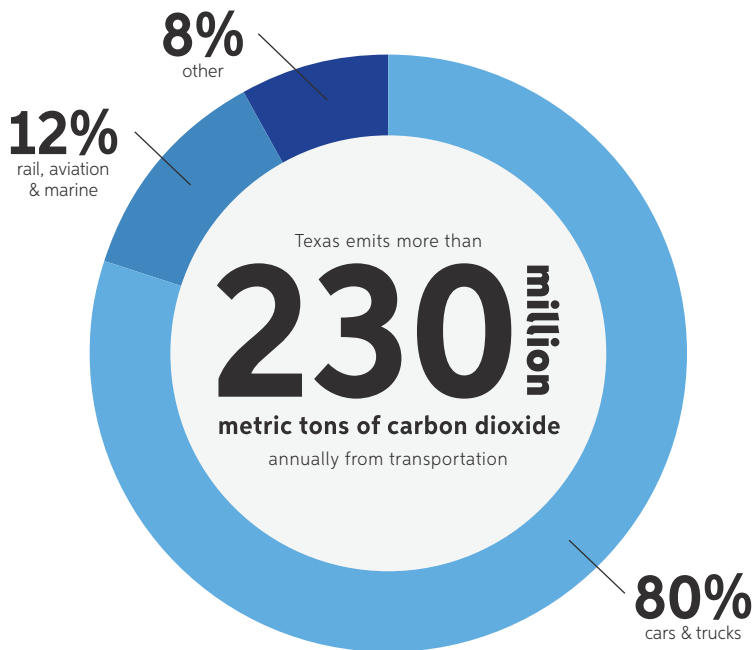
Navigating Texas to Net-Zero Transportation Emissions

Five takeaways from UH Energy researchers.

BY RASHDA KHAN

The federal government has set an ambitious clean energy agenda aimed at achieving net-zero greenhouse gas emissions by 2050. This calls for transformative action across the United States.

Even with immediate measures, such as state-focused policy drivers in place over the next two years, and significant investments of more than \$30 billion over the next 25 years, reaching net zero in the transportation sector in Texas might be unlikely, according to a University of Houston white paper titled “Net Zero in Texas: The Role of Transportation.”



Daunting Emissions Challenge

Texas emits more than 230 million metric tons of carbon dioxide annually from transportation, 80% of which originates from cars and trucks. The size of the task: Replacing more than 20 million cars and light trucks over the next 25 years. Even with an aggressive plan, the state is projected to fall short of carbon neutrality in transportation by 2050.



Labor Market Dynamics

While electric vehicle adoption promises job creation, wages in the EV industry are lower than traditional auto sector wages. Upskilling and reskilling the current workforce will be imperative to make economic gains.

\$30 billion - \$50 billion

needed to achieve net-zero emissions in Texas

Substantial Infrastructure Investment Needed

Achieving net-zero emissions in Texas requires \$30 billion to \$50 billion in public funds, matched by private sector investment. Estimates suggest annual spending of \$250 million to \$640 million is needed for Level 2 charging stations and up to \$1.3 billion for DC fast charging stations by 2040.



Global Resource Demands

By 2050, Texas' demand for lithium and cobalt for EV production will surpass current worldwide production levels, highlighting the need for secure and sustainable supply chains. Experts predict a 140% to 500% surge in demand by 2050, which may lead to price hikes.

Environmental Remediation

Making the switch from vehicles with internal combustion engines to EVs will retire many gas stations, requiring \$2 billion to \$5 billion for environmental remediation.



In conclusion, despite the challenges, there are opportunities. The transition could yield between 40,000 to 180,000 new jobs by 2050 and bring about more than \$100 billion in public health benefits for Texans through reduced air pollution. 



Scan the QR code to read the entire white paper, “Net Zero in Texas: The Role of Transportation.”

STUDENT SUCCESS

Tackling the Global Plastics Problem

UH students turn an innovative product into a promising business plan for sustainable packaging in the shipping industry.

BY RASHDA KHAN



Arianna Chavarria (left) and Fernanda Ruelas (right) are part of the ShipSafe team that placed second at the inaugural Circular Plastics Challenge, hosted by the UH Energy Transition Institute.

A team of University of Houston undergraduate students from No. 1-ranked Cyvia and Melvyn Wolff Center for Entrepreneurship have found success with their innovative proposal ShipSafe, a renewable packaging company dedicated to helping companies transition to cleaner supply chains.

Arianna Chavarria, Fernanda Ruelas, Nicolas Einarsson and Bennett Mainini won second place for their proposal at the inaugural Circular Plastics Challenge, hosted by the UH Energy Transition Institute. The competition challenged students to address the critical issue of plastic waste and create a real-world circular economy.

ShipSafe is built around a biodegradable plastic developed and patented by Megan Robertson, a chemical engineering professor at the UH Cullen College of Engineering. This unique material uses a vegetable oil additive with a biologically derived plastic to enhance durability, making it resistant to breaking during use.

The team, which also placed in the Wolff Center's IP Business Plan Competition, took this innovative material and transformed it into a viable business concept, coming up with a plausible product, identifying a market and creating a business plan.

"My biggest takeaway was a deeper understanding of the push that many energy companies have to switch over to cleaner supply chains and materials," Ruelas says, noting that the extensive research required was a major challenge. The team studied market drivers, technical and intellectual property, and other topics to craft the plan.

More than 60 students participated in the Circular Plastics Challenge. It is one of the many interdisciplinary UH projects that leverage the power of collaboration. Students engage with subject matter experts, venture capital and investment specialists, and successful entrepreneurs to sharpen their understanding and drive positive change. The field of competitors was pared down to six finalist teams, who presented their solutions at the 2023 Energy Night hosted by the UH Energy Coalition.

"If you look at the wide variety of proposals and approaches, you can see the complexity of the problem and all the different things that society must consider

finding solutions to," says Joe Powell, founding executive director of the ETI. "I think circularity in plastics and chemicals is as difficult to address as the net-zero issue within the energy sector — if not more. We have a unique opportunity here to tackle both, and it's really great to see our students thinking ahead."

The UH ETI is an academic research institute focused on advancing reliable, affordable, environmentally responsible energy for all through a just and equity-driven pathway. It aims to benefit vulnerable communities and, in addition to circular plastics, focuses on carbon management and hydrogen. The ETI offers opportunities for student development and facilitates top-tier research and thought leadership by partnering with UH colleges, departments, centers and institutes.

"In terms of impact and thinking about circularity and coming up with out-of-the-box solutions, we're off to a great start at the University of Houston," Powell says. "It's a really complex problem to go after, and I give the student teams credit for putting solutions together and showcasing some really innovative thinking."

The competition may be over, but the team's work is far from finished. Ruelas and Chavarria, who both graduated in May, are moving forward in their efforts to get the patent licensed and into market.

"The next steps for ShipSafe involve refining our business plan, competing in additional competitions to secure funding and establishing a board of advisors composed of industry leaders," Chavarria says. "These initiatives align with our goal to further develop ShipSafe and position it as a leader in sustainable packaging solutions."

As newly minted graduates entering the workforce, they agree the experience has been invaluable.

"This sort of industry is hard to push into because of the learning curve and the fact that many people would not expect a college student to keep up with their conversations or ask good questions, so you should always be 110% prepared to get challenged and to push forward," Ruelas says. "Any time you can compete or present is a learning and networking opportunity, worth your time and effort in the long run." 



The Significance of ShipSafe

According to the team's business plan, ShipSafe addresses the need for environmentally friendly materials in the shipping industry as global concerns about plastic pollution and climate change mount. The product sets itself apart in three important ways:

Biodegradable Plastic

ShipSafe is composed of a patented biodegradable plastic formulation, ensuring minimal environmental impact.

Sustainable Shipping

By replacing traditional plastics with ShipSafe, businesses can significantly reduce their carbon footprint and contribute to a cleaner planet.

Viable Alternative

ShipSafe enables businesses to maintain the quality of their packaging with a viable alternative to traditional plastics.

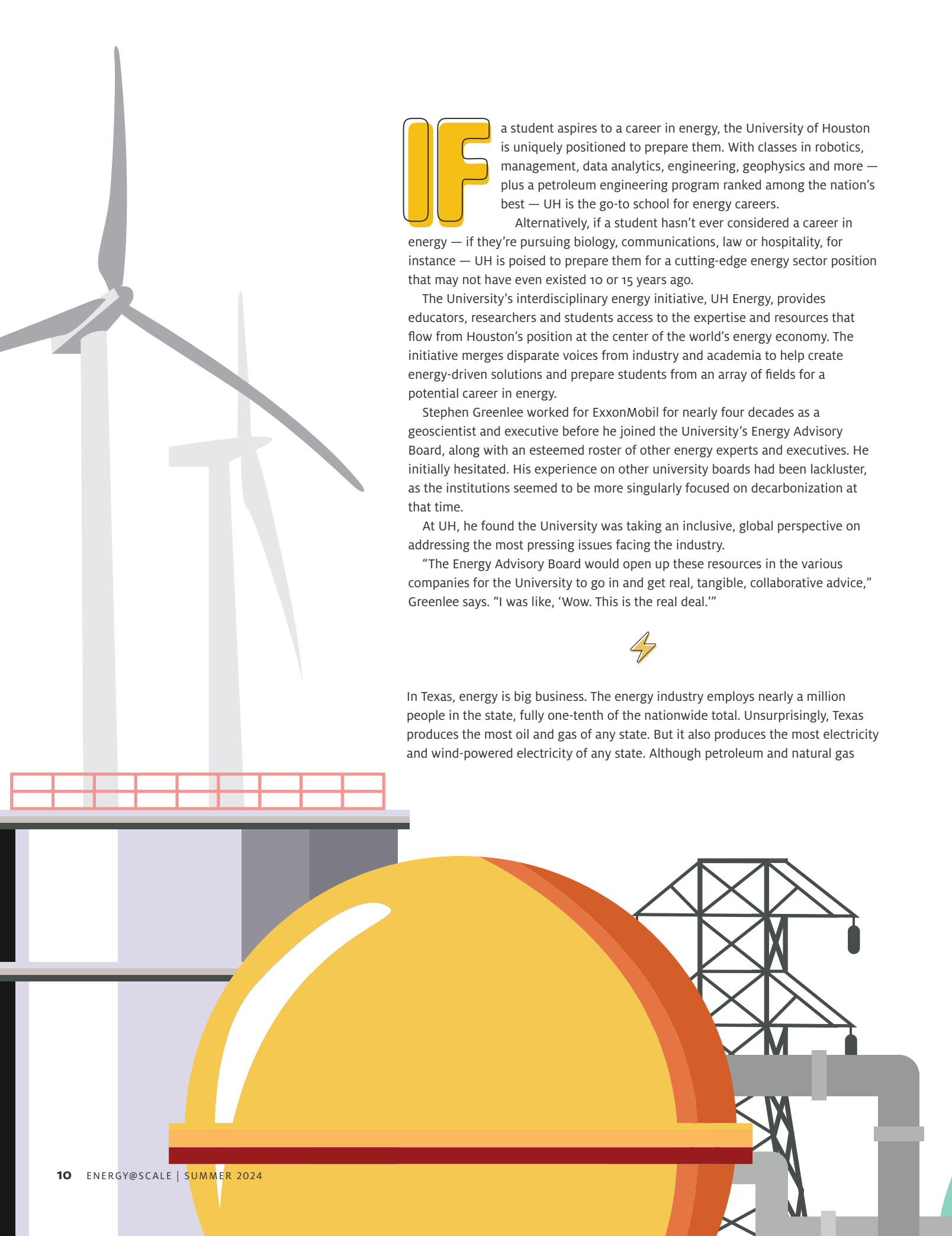
THOUGHT LEADERSHIP

YOUTHFUL ENERGY

UH prepares students across majors
to become energy leaders.

BY SAM EIFLING





IF

a student aspires to a career in energy, the University of Houston is uniquely positioned to prepare them. With classes in robotics, management, data analytics, engineering, geophysics and more — plus a petroleum engineering program ranked among the nation's best — UH is the go-to school for energy careers.

Alternatively, if a student hasn't ever considered a career in energy — if they're pursuing biology, communications, law or hospitality, for instance — UH is poised to prepare them for a cutting-edge energy sector position that may not have even existed 10 or 15 years ago.

The University's interdisciplinary energy initiative, UH Energy, provides educators, researchers and students access to the expertise and resources that flow from Houston's position at the center of the world's energy economy. The initiative merges disparate voices from industry and academia to help create energy-driven solutions and prepare students from an array of fields for a potential career in energy.

Stephen Greenlee worked for ExxonMobil for nearly four decades as a geoscientist and executive before he joined the University's Energy Advisory Board, along with an esteemed roster of other energy experts and executives. He initially hesitated. His experience on other university boards had been lackluster, as the institutions seemed to be more singularly focused on decarbonization at that time.

At UH, he found the University was taking an inclusive, global perspective on addressing the most pressing issues facing the industry.

"The Energy Advisory Board would open up these resources in the various companies for the University to go in and get real, tangible, collaborative advice," Greenlee says. "I was like, 'Wow. This is the real deal.'"



In Texas, energy is big business. The energy industry employs nearly a million people in the state, fully one-tenth of the nationwide total. Unsurprisingly, Texas produces the most oil and gas of any state. But it also produces the most electricity and wind-powered electricity of any state. Although petroleum and natural gas

have long been king in Texas — and particularly in Houston — the economy is expanding to include a more diverse, more innovative approach to the energy sources of the future.

Traditionally, the path to a career at an oil and gas company has started with a technical degree of some sort: engineering, the natural sciences, computers. Eventually, though, the workers who become leaders at those organizations need to master the business side. Whether a company is exploring for oil and gas, managing a nuclear plant or pioneering renewables, its leaders should understand laws, regulations and cultures in addition to hard sciences.

The industry's ever-growing complexity provides an opportunity for people from different backgrounds to find their place in it. Elizabeth Killinger, another member of the Energy Advisory Board, graduated from UH in 1991 without any expectation of working in energy. During business school, she concentrated in management information systems, which led to a career in consulting. Among other clients, she advised Reliant Energy and eventually ended up working there full-time.

"Through that journey, I realized every single function in a company is important, and energy fuels so much of it," says Killinger, a section 16 officer and executive vice president of NRG, as well as president of NRG Home and Reliant. "When you're in college, you can't imagine it because you haven't tasted any of that. Through the energy student organizations or even some of the business school organizations, you actually begin to get those experiences."



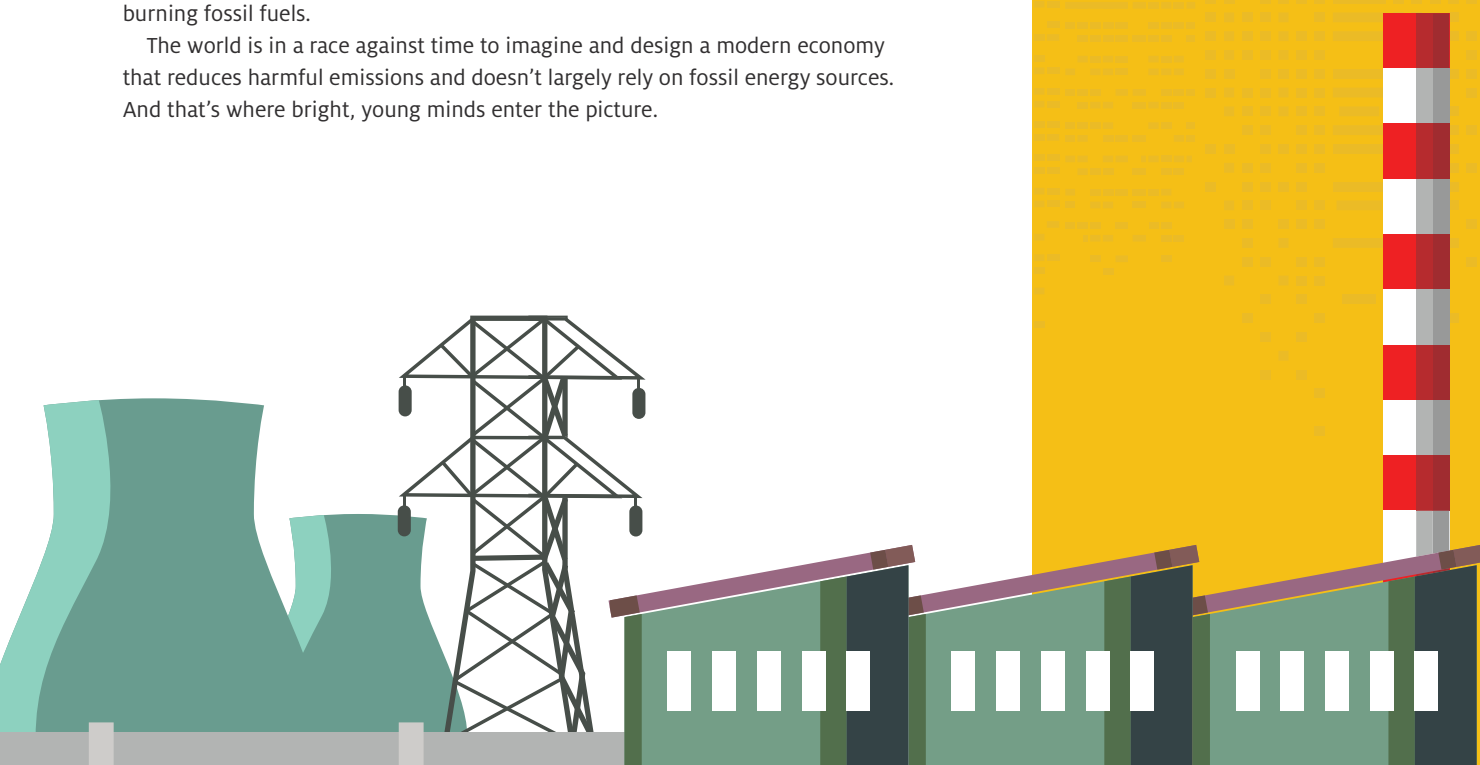
Many of the University's 16 colleges are involved with UH's interdisciplinary energy initiatives and research, ensuring students like Killinger — who aren't envisioning a career in energy — will at least gain exposure to the field and have opportunities to grow their knowledge and skills if they change their mind.

"Drill deeper" is no longer the mantra. The largest energy companies on the planet know that increasingly popular (and cheaper) renewable and alternative energy sources are already replacing oil and gas in many use cases. For the world to reach the latest international climate goals — specifically, for the world's energy production to be net-carbon neutral by 2050 — these companies need to find ways to create and deliver huge amounts of energy that aren't derived from burning fossil fuels.

The world is in a race against time to imagine and design a modern economy that reduces harmful emissions and doesn't largely rely on fossil energy sources. And that's where bright, young minds enter the picture.



The Energy University, ***prepares students for cutting-edge energy sector positions*** that may not have existed 10 or 15 years ago.



The UH Energy Coalition is ***the largest independent energy-centric student organization in the nation.***

5,000+
members
and more than
34
energy-related
student
organizations



Jamie Belinne is the associate dean for career and industry engagement at the C. T. Bauer College of Business, where she teaches a core course for all business majors. In the spring of 2024, the class ran a case competition called “Truth in Energy,” sponsored by ConocoPhillips, in which students competed to create petroleum-free alternatives to existing consumer products, such as tires, paint, toothbrushes, deodorant and more. The students are required to include the financial, environmental and business implications of moving to the replacement they propose in their research.

“It’s not a case of trying to tell the students what’s good, what’s bad, what’s right, what’s wrong,” Belinne says. “But it’s helping them think critically about the challenges we face with trying to create sustainable alternatives to petroleum-based products and the value the petroleum industry does provide to our economy as well.”

The goal of the competition is, in part, to push students to ask the sorts of vital business questions that drive corporate

decision-making. It’s the kind of exercise meant to challenge youthful assumptions about how the consumer economy runs. But it’s also a chance for energy companies to identify students capable of creative thinking, rigorous market analysis and disruptive attitudes that may mark the next generation of energy executives.

“The goal of higher education is to get people to think critically about problems,” Belinne says. “Students also come in with no preconceived notions. They have a goal and a dream for what they want the world to be. It’s easier for them to say, ‘Yeah, it’d be hard to change, and it would cost money, but here’s how we might recover those costs and here’s how we could do things differently.’ They’re not as afraid of radical change.”



At UH, institutional support for the energy initiative starts at the top. UH President Renu Khator assembled the Energy Advisory Board 15 years ago with the goal

of aligning the University's energy-related academic programs and research with the evolving needs of industry, complementing one of Houston's core strengths. The board lends strategic guidance in the areas of upstream, midstream and downstream; alternative energy; and environmental sustainability. Over the years, Khator has engaged regularly and deeply with the board to ensure UH is at the forefront of the critical issues in energy and proactively responsive to changing needs.

The city's roster of Fortune 500 companies includes heavyweights Chevron, Shell, ConocoPhillips, ExxonMobil, Phillips 66, Equinor, BP, Baker Hughes, NRG Energy, Schlumberger, Halliburton, TXU Energy and a host of others. That translates to an immense amount of reach, know-how and resources for the University to capitalize on — and for students to take advantage of as they hone their own specialties.

With sustained support from industry and University leaders, the UH Energy initiative has a strong presence across disciplines.

"They really work to reach out," says Margaret Kidd, an instructional associate professor of supply chain and logistics technology in the Cullen College of Engineering. "They're working with the law school, they're working with the business school, they're working with the College of Liberal Arts and Social Sciences. They're working with the public policy school. They're truly working across the entire ecosystem."

Among the ways the University encourages cross-pollination is by

sponsoring the Energy Coalition, a 5,000-plus members strong student organization, and by holding competitions. One such event last year, Kidd says, focused on plastics and drew entrants from all corners: roughly one-third engineering students, one-third business students and another third from other disciplines.

There were two dozen teams, all facing off to devise the most innovative and viable solutions to eliminating needless plastics from the economy and the environment. And, as young people do, they had a blast.

"As a professor, you like to have opportunities where you can engage your students," Kidd says. "They learn, but they also build skill sets, they build networks and just take education in a more holistic direction. About two years ago, we started looking at undergraduate research to channel these things — working as a team, working to solve critical problems. And we've found we've created this monster. Our students are loving it."

Once the dust settles, students will be primed to bring that sort of applied ingenuity to corporate and startup jobs wherever they go. A healthy triple bottom line — one that accounts for environmental and human effects, as well as profitability — requires more creativity and diligence than pursuing profit alone. After years of tapping into the resources and thinking of industry minds, UH students will be ready to apply their talents to companies that, more than ever, value exactly that sort of youthful energy. 





Assistant Professor Mim Rahimi's team develops electrochemical processes to mitigate climate change and help industries become more energy efficient.

PERSPECTIVES

Carbon Dioxide Removal: A Key Strategy for Fighting Climate Change

Two UH professors share expert insights on the role of CDR in the energy transition.

BY RASHDA KHAN

In the global push to address the negative impacts of climate change, carbon dioxide removal has emerged as a key economic and environmental strategy. Methods such as direct air capture, direct ocean capture, bioenergy and soil carbon sequestration may help reduce emissions, particularly in sectors such as agriculture and air transportation.

Although the economic prospects of CDR are promising, obstacles such as high costs and energy-intensive processes remain. Recent research highlights the need to accelerate carbon removal, as current plans may fall short of meeting Paris Agreement benchmarks.

Two University of Houston experts offer their different perspectives on CDR and its role in the energy transition.

Tracy Hester is an associate instructional professor of law, teaching environmental law at the UH Law Center. He is also co-

director of the Environment, Energy and Natural Resources Center and founding co-director of the UH Center for Carbon Management in Energy. His research focuses on the innovative application of environmental laws to emerging technologies, including climate engineering, deep decarbonization, nanoscale materials and microplastics, and climate liability.

Mim Rahimi is an assistant professor of environmental engineering at the UH Cullen College of Engineering and an affiliate faculty with the Materials Science and Engineering program. His research lab is developing a range of electrochemical processes to help industries become more energy efficient and to capture carbon dioxide from ocean and air point sources. His research team's specific interests include energy and sustainability, electrochemical processes, and using artificial intelligence for climate mitigation.



TRACY HESTER

Instructional Associate
Professor of Law

Leveraging the Power of Policy

What role does policy play in the CDR arena impacting decarbonization and clean energy efforts?

TH: Without policy incentives and help with regulatory roadblocks, carbon dioxide removal simply won't happen as quickly as we need.

Capturing greenhouse gases from ongoing human activities, as well as addressing our historical buildup of past greenhouse gas emissions, requires government policies that provide financial incentives to capture the gases, remove regulatory roadblocks to building these projects, and map out how to protect vulnerable communities and companies working in this area against unexpected disruption and liabilities.

What implications does CDR have for climate justice, and which stakeholders will be affected?

TH: CDR could have deep implications for climate justice, but it all depends on how we approach it. If we place large industrial machinery to capture greenhouse gases in vulnerable communities that already bear an outsized burden, CDR could aggravate concerns about climate justice.

But CDR that targets ambient greenhouse gases that already exist in the atmosphere can go virtually anywhere, depending on the technology and disposal method. Even CDR that goes into environmental justice communities can still transparently and intelligently address concerns of the community and prevent new projects from aggravating existing problems — or even improve them.

Tracy Hester serves on the American Bar Association's Climate Change Task Force and represented the ABA three times as a delegate to the UN Climate Conferences of Parties (2021-2023). In 2023, he was inducted as a senior fellow of the Global Council on Science and Environment and served as president-elect of the American College of Environmental Lawyers. Hester was elected to the American Law Institute in 2004 and was named the Top Environmental Lawyer in Houston by Best Lawyers of America in 2011.



MIM RAHIMI

Assistant Professor
of Environmental Engineering

Researching a Path to Cleaner Energy

How should we support research and development in the CDR arena to more effectively meet goals related to decarbonization and clean energy efforts?

MR: Support should focus on existing technologies, such as direct air capture, as well as emerging technologies.

Although land-based CDRs such as bioenergy with carbon capture and storage and direct air capture have received significant attention, they have drawbacks, such as land requirements and cost. This underscores the need for exploration of promising alternatives such as ocean-based CDRs.

Ocean-based CDRs capitalize on the natural tendency of ocean systems to absorb carbon dioxide from the atmosphere. A number of these technologies, including ocean alkalization, ocean fertilization and artificial upwelling/downwelling, are under development but have not yet reached commercial viability.

Share how your research is contributing to CDR efforts.

MR: In our lab, we are developing a wide range of electrochemically driven direct ocean capture processes, from fundamental research to practical large-scale implementations. These processes offer several advantages, such as scalability, modularity and cost-effectiveness.

What markets and opportunities exist for CDR?

MR: Several markets exist for the carbon dioxide captured through CDR processes, but the most common application is in enhanced oil recovery. Other emerging applications include precursors for cement production, the food industry and agriculture. 

Mim Rahimi, Ph.D., won the prestigious National Science Foundation CAREER Award for his proposal "Leveraging Liquid-Liquid Interfaces for Innovative Electrochemical Carbon Capture" in 2024. Rahimi and his team of doctoral students won the UH-Chevron \$25K Energy Transition Challenge in 2023 and the U.S. Department of Energy's National Energy Tech University Prize of 2024. He earned his doctorate in chemical engineering from Penn State and was a postdoctoral associate in the Department of Chemical Engineering at the Massachusetts Institute of Technology.

SPOTLIGHT

Kamalpreet Kaur: Energizing the World

The UH business alumna is a shining example of a new generation of leaders shaping the future of energy.

BY RASHDA KHAN

What she's doing now: A recent University of Houston graduate, Kamalpreet Kaur (B.B.A. '19) is the commercial leader for low carbon solutions, CCUS and hydrogen at NOV Inc., a company that offers technology-driven solutions to empower the global energy industry. She oversees the strategic aspects of business development in the low carbon space, helps track technological advancements and develops new initiatives. Kaur also serves on the UH Energy Coalition's new advisory board to help foster energy conversations between UH students, alumni and industry professionals.

What she thought she'd be doing: Growing up, Kaur enjoyed reading about successful business leaders and decided early on to pursue a business-focused career. At UH, she double majored in management information systems and marketing at UH's renowned C. T. Bauer College of Business. "I was more focused on data and the impact it has on our decisions and strategy as well as marketing," she says. "Energy was an industry that I had initially never really considered."

How UH opened her mind to the energy sector: Kaur connected with the UH Energy Coalition. The energy-focused student organization has more than 5,000 members — making it the largest such organization in the nation. She found herself attending insightful energy-related seminars, being invited to energy events and meeting industry experts, which led to being mentored by UH and industry leaders. She credits the organization for leading her to a career she is passionate about.

“ I always thought oil and gas was pretty much all engineer-focused until I realized that, like any industry, it has multiple aspects to it. The key is to find your place in it so you can do work and have a positive impact on the world. ”

How her generation shapes her point of view: Kaur says growing up as part of a technologically advanced generation that values environmental stewardship — and having lived through the COVID-19 pandemic and the Texas grid failure during the 2021 winter storm — makes her passionate about her work. "There is a sense of social responsibility and purpose that the energy transition brings," she says.

Her advice to UH students: "Opportunities are not going to come to you. You must go after them." 📺



Kamalpreet Kaur is the host of the "Wired In: The New Age of Connectivity" podcast. **Scan the QR code** to access the latest episode.

3 Ways to Level Up

Your Industry Knowledge

UH Energy Programs and Events for Professionals

1

Train

As industries pivot towards decarbonization, gaining a comprehensive understanding of carbon capture, utilization and storage is crucial. **The Carbon Capture Utilization and Storage Executive Education program** offers a self-paced, 12-week online course that includes pre-recorded sessions and live discussions with industry experts. You'll explore the technology, economics and challenges of CCUS, equipping yourself with the knowledge needed to stay competitive in the energy sector.



Request Info

2

Learn

Dive into the emerging field of hydrogen with the **Hydrogen Economy program**. This interactive course, offered in collaboration with the American Institute of Chemical Engineers, covers production, transportation and commercial opportunities in the hydrogen sector. Participants will work on a capstone project, consolidating their knowledge and earning digital badges and certificates. This program is a great way to enhance your expertise and position yourself at the forefront of this exciting industry.



Enroll Here

3

Attend

Mark your calendar for October 24-25 to attend the **University of Utah Energy & Geoscience Institute and University of Houston Joint Technical Conference**. This event, held just before the Utes and Cougars clash on the football field, will feature leading experts discussing the latest advancements in oil and gas, carbon management, hydrogen, renewable energy integration, and geothermal energy. Don't miss this opportunity to engage with thought leaders and expand your professional network.



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