The future of... ENERGY

BY MARIE CENTANNI

Colin Richie

> **This could be our saving grace.**
>
> *– Quay McKnight, Chairman and President, M&M International*

What could not only extend the life of Louisiana's oil and gas industry, but amplify it altogether

They're up to 55 employees at the headquarters of M&M International on Highway 90 in Broussard. That number has edged up a tad in recent months as movement gradually increases in the oil and gas industry, with production making up for lost time after nearly two years of COVID-related dormancy.

"Activity has put a little wind in our sails over the past six months," says M&M Chairman and President Quay McKnight. "At one time we had more than 100 employees, but it's never really been the same since the bust."

Since 1980, M&M has manufactured well control valves used in drilling and production of oil and gas, and like all their colleagues along Louisiana's "energy corridor," McKnight's family has lived through all the ups and downs. He's cautiously hopeful of a mini-boom in the near future, as supply plays catch up with the slowly ticking-up demand of economic recovery. But he says it will be nothing like the past. And due to factors like coastal lawsuits chasing the industry out of state, the boom could bypass Louisiana.

"I don't know what's going to happen with offshore. It has never come back since 2015 really, and that was a big part of our business. Inland drilling is not coming back here." But there's something giving the M&M team a reason to hope: Carbon Capture Utilization and Storage, CCUS. And they stand at the ready to leverage the opportunity.

"For Louisiana, carbon capture could be huge, because we may not be able to take part in the next drilling boom like we have in the past. This could be our saving grace. We're hoping that as the carbon capture market grows and matures, they're going to need equipment exactly like or similar to what we already make. If it's not exactly the same, we hope to work with the companies doing this injection to manufacture whatever equipment we need to be successful."

And he has good reason to be hopeful.

"When we talk about the future of energy in Louisiana, the main theme is decarbonization," says David Dismukes, executive director of LSU's Center for Energy Studies. "What you see right now is everybody–whether you're upstream at the wellhead level or down at the refinery–everybody is dealing with the issue of decarbonization. The good news is in Louisiana, we're leveraging things we've developed in the energy industry to get it done."

Dismukes says there are three factors that make CCUS a historic and very realistic opportunity for Louisiana to not only preserve its oil and gas industry, but to grow it. First, our expertise–home grown companies like M&M, with decades of know-how on everything from geology to process technology to pipelines and even legal and regulatory framework. Second, our natural geologic storage capacity. And third, a growing demand for emission reduction particular to Louisiana that's not going to be solved by wind or solar.

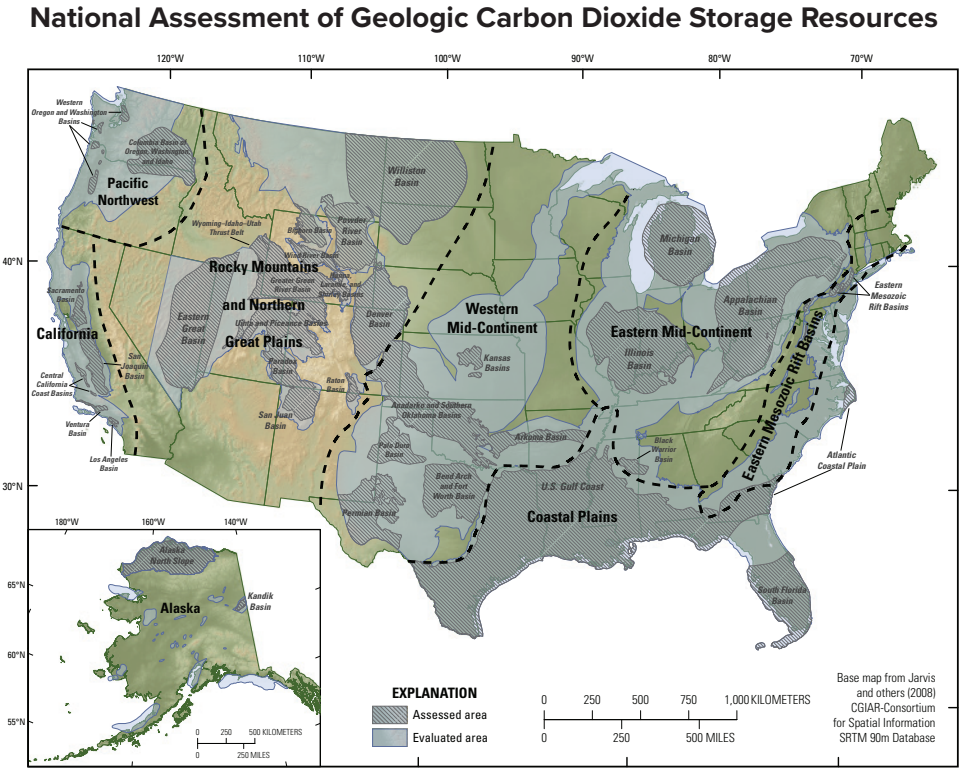
"If you look at all the greenhouse gas emissions in Louisiana," says Dismukes, "Eighteen percent comes from power generation, but 60% comes from industry. So we've got to think out of the box. If you look at the U.S. overall, those numbers are flipped. The rest of the nation focuses on wind and solar, but we've got bigger fish to fry than that."

What's more, when it comes to the major manufacturing investments in Louisiana, there's a timeline looming. Especially for LNG-Liquefied Natural Gas.

"Those individual plants are $9-12 billion each. They're not doing it for the U.S. market, they're exporting it to Asia and to a lesser extent, Eastern Europe. And those Paris Accord countries on the receiving end demand a green angle on developing LNG. Half the capital investment through 2029, maybe 60% even, is LNG. If you don't address decarbonization, you put at risk 60% of investment announced through 2029."

In other words, there's a giant financial incentive for Louisiana to develop its CCUS market. And with regards to storage–it turns out the bayou state may be the best spot in the nation.

In 2013, The U.S. Geological Survey assessed and quantified the nation's geologic capacity for carbon dioxide storage, mapping out "technically accessible" geologic formations at least 3,000 feet below the ground surface onshore and in state waters. What did the study find? The "Coastal



The USGS found that 60% of the nation's capacity for carbon dioxide storage lies in the Coastal Plains region defined here, with Louisiana in the center.

Tim Mueller

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– David Dismukes, Executive Director of LSU's Center for Energy Studies

Plains" region, a swath of Gulf States from southern Texas to Florida, holds most of the capacity, with Louisiana front and center.

"At 59% of the nation's capacity for storing carbon dioxide, the Gulf Coast region has by far the greatest potential for storage, and Louisiana is at the epicenter of that region," says Peter Warwick, USGS project chief for the study.

That could be a mix of salt domes, which Dismukes says are best for blue ammonia or hydrogen, that needs to be accessed readily, almost like a distribution warehouse. But for long-term storage, Louisiana's years of oil and gas activity actually produced one of the preferred options in the form of empty oil and gas reservoirs, where extraction occurred. There are tax credits for underground storage that incentivize such activity–but Louisiana has another untapped potential storage market that could solve a growing challenge if the benefit can be quantified: our coastal wetlands.

"Coastal wetlands have always captured massive amounts of carbon, this is nothing new," says Justin Ehrenwerth, President & CEO of the Water Institute of the Gulf. "Our wetlands have always been extraordinarily powerful in their ability to capture and sequester carbon." But he says the marketplace - the credits and quantification of value, was created with trees in mind, not swamps. And trees, well, they stay where they're planted.

"These standards were originally created with forests in the middle of the country in mind," he says. "Of course, forests capture carbon, but the most current science shows that our wetlands capture far more carbon per acre than forests, sea grasses, mangroves - we outpace all of them. The challenge is if you look at a forest in the middle of the country versus a wetland along the coast, our coast is more dynamic. So, it becomes a question of permanence. How long do you expect that wetland to be in place, and what happens to the stored carbon if the wetland is hit by a hurricane or otherwise degrades? Well, when the standards were first imagined, we looked at a continuum of 100 years. There's no wetland in the world where you can say what will happen in 100 years."

Ehrenwerth and his team are going through the process of quantifying the amount and length of time carbon can be stored in coastal wetlands–science that could serve as a baseline for future crediting mechanisms and markets. If these market challenges are solved, it could open up a world of incentivized private sector investment in wetland creation and protection.

"For many, this is the holy grail. Louisiana has a 50-year, $50 billion coastal master plan, and the state has identified a good chunk of the needed funding, but this could be a remarkable opportunity to incentivize private investment. There's a real opportunity to connect a growing and unmet demand in the marketplace for high-quality, natural, carbon removal offsets. The state has wet-

ExxonMobil

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land restoration projects ready to go now that we know provide so many economic, environmental, and social benefits and we believe could yield significant carbon removal benefits too. All of that would likely mean an ROI in a functional carbon market."

This Holy Trinity of expertise, incentive and storage is already driving new investment, like the $11 billion, 1,200-acre G2 Net-Zero complex in Cameron Parish, an LNG production facility that will use natural gas, capturing all emissions and using them to generate electricity. Chairman Chas Roemer says the project will ultimately be a $20 billion investment, ensuring the continuity of Louisiana's industry-related workforce.

"The thing I'm pleased with," says Roemer, "is that first of all, we can show we can use Louisiana resources-our natural gas. And we can use a lot of infrastructure that's already in place and expand on that even further. We also can use our natural advantages for storage and be a leader in the world for how you generate a lot of power and keep American energy independence."

And it's not just newcomers, either. Louisiana's leading industry employers are investing heavily in emission reductions, including CCUS. In December, ExxonMobil announced it was boosting spending on greenhouse gas emission reduction projects by $12 billion, for a total of $15 billion, and expects to meet its 2025 reduction plans by the end of this year. The investments range from projects to reduce emissions from existing operations to a greater investment in the Low Carbon Solutions business.

"ExxonMobil will continue to play an important role in bringing carbon capture and sequestration technology to scale, because of our depth and breadth of experience," says Stephanie Cargile, ExxonMobil Baton Rouge Public and Government Affairs manager. "We understand the subsurface. We know how to build large projects, and we know how to operate them safely and efficiently. The same capabilities, technical strengths and market experience that support base energy and chemical businesses will help drive commercial growth opportunities for carbon capture and storage, biofuels and hydrogen where supportive policies currently exist and provide for strong returns."

What CCUS is revealing for Louisiana, Dismukes says, is that decarbonization doesn't have to be an either/or scenario, where the oil and gas industry risks abandonment. Quite the contrary.

"Think of all those jobs drilling, the geologists to evaluate, the engineering to monitor, the consultants and the lawyers, the marketing people-just the direct jobs and it's a whole new industry," he says. "It really transforms an existing industry and creates another one at the same time. Some would prefer either/or, but we don't have to be there. There's a loud minority out there that just wants to see these folks pack up and leave. That's just not economically realistic."

Roemer agrees. "We've got to remember the renewables movement really started with the idea of lowering emissions. It's become more political in its goals, but the real point was to eliminate emissions. Well, if I can produce 50 times the power at a 20th of the footprint and have no emissions, why would there be any need to phase out the use of natural gas?

"I'm very bullish on our future," says Roemer. "We've got to continue to be innovative and bold, but there's no reason Louisiana shouldn't be the leader in the world and provide energy to the world and byproducts to the world while eliminating emissions." ■