SHALE MAGAZINE

JULY/AUGUST 2020

THE BEGINNING OF THE END?

COVID-19, ENERGY AND THE ECONOMY

THE UNDELIVERED PROMISES OF CLIMATE ACTION PLANS BY U.S. CITIES

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OUR COUNTRY AND ECONOMY ARE SHAKING OFF THE EFFECTS OF THE LOCKDOWN, BUT OUR FUTURE IS STILL FAR FROM CERTAIN.

One of the few things we can count on is bringing you another information-filled issue of SHALE. Our experts and contributors have again come together to keep you informed during the fast-paced changes the energy industry is experiencing during this time of COVID-19.

We are honored to have Mike Howard on the cover of SHALE. In his interview with David Blackmon, we learn to identify our priorities and live by them. This is a lesson the pandemic is teaching us all.

This year has already been more than eventful, but let's not forget it is also an election year, and it is one the energy industry will be watching closely. In this issue, we look at changes the industry could see depending on the election results. And, closer to home, we examine what the upcoming school year will be like.

Don't forget SHALE and Texas Energy Advocates Coalition (TEAC) will be presenting our annual State of Energy Luncheon in Corpus Christi at the Omni Hotel on Sept. 22. Our featured speakers will be Sean Strawbridge, CEO, Port of Corpus Christi and Mike Howard, CEO, Howard Energy Partners.

We hope you enjoy this issue, and we hope you join us at the State of Energy Luncheon.

KYM BOLADO
CEO/Publisher of SHALE Magazine/Editor-in-Chief
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PHOTO BY MICHAEL GIORDANO

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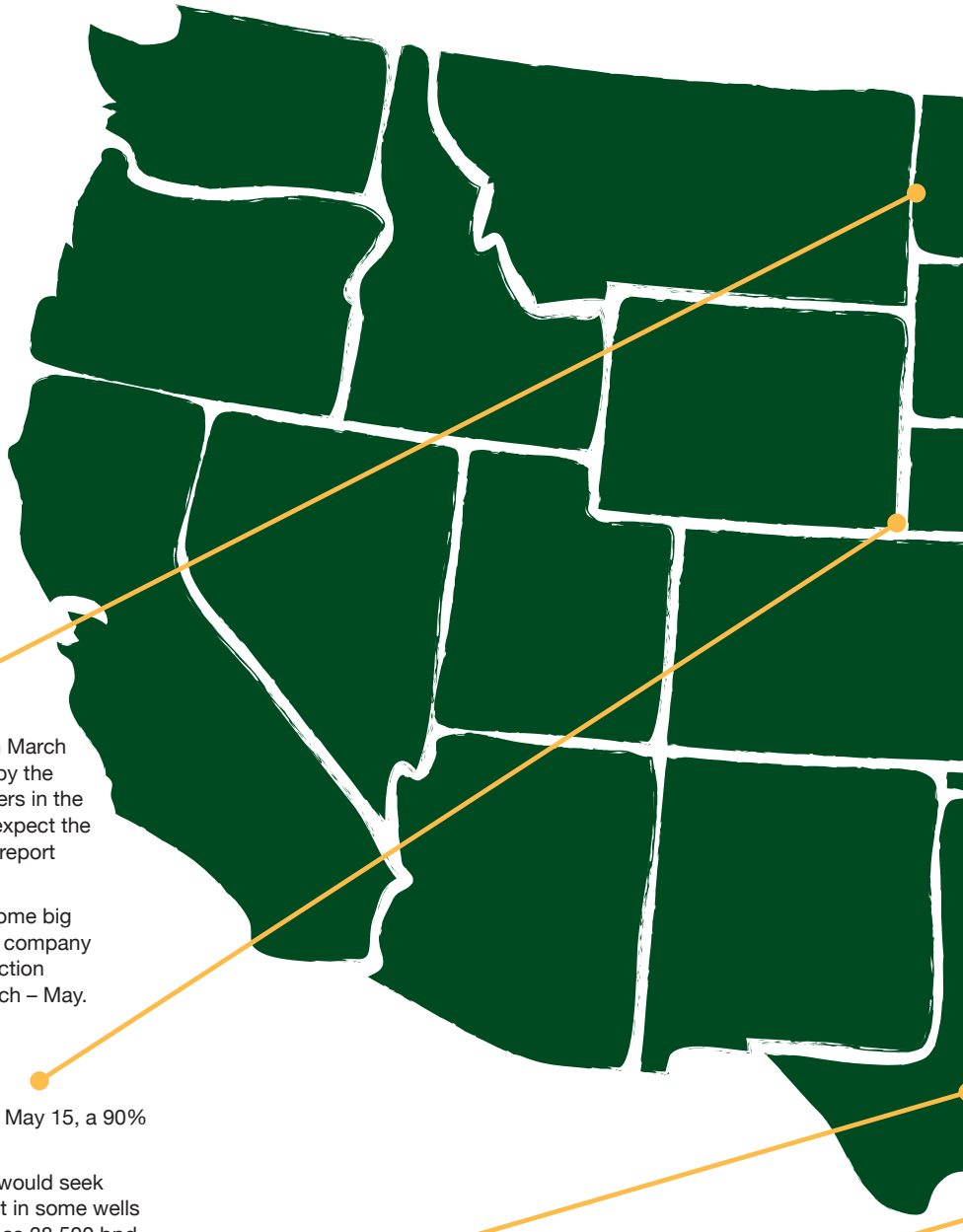
SHALE PLAY SHORT TAKES

By: **David Blackmon**



Bakken Shale – North Dakota/Montana

Crude output in the Bakken Shale dropped by 15% from March to April, the largest such one-month drop ever reported by the North Dakota Industrial Commission. With major producers in the region shutting in many more wells during May, we can expect the Commission, which reports on a two-month time lag, to report another dramatic reduction in overall production soon.

But, as prices recovered above $35 per barrel in June, some big producers said they would be restarting wells. One such company is EOG Resources, which said it would accelerate production levels after shutting in about 25% of its wells during March – May.

Denver/Julesburg (DJ) Basin - Colorado

Just three rigs were actively drilling in the DJ Basin as of May 15, a 90% reduction since March 1.

DJ Basin producer Extraction Oil and Gas announced it would seek bankruptcy protection in mid-June. Before having to shut in some wells due to the price bust, Extraction had produced as much as 38,500 bpd during the first quarter of 2020. Extraction became the second-largest DJ Basin operator to file for bankruptcy this year, following Whiting Petroleum, which filed Chapter 11 in April.

Permian Basin – Texas/New Mexico

The rig count in the Permian Basin remained the highest of any play area, standing at 131 at the end of June, which represents almost half of the active rigs in the country.

June also saw several Permian producers, like Parsley Energy and EOG Resources, announce they were reactivating many of their shut-in wells in response to healthier crude prices, which rose above $40 at several points late in the month.

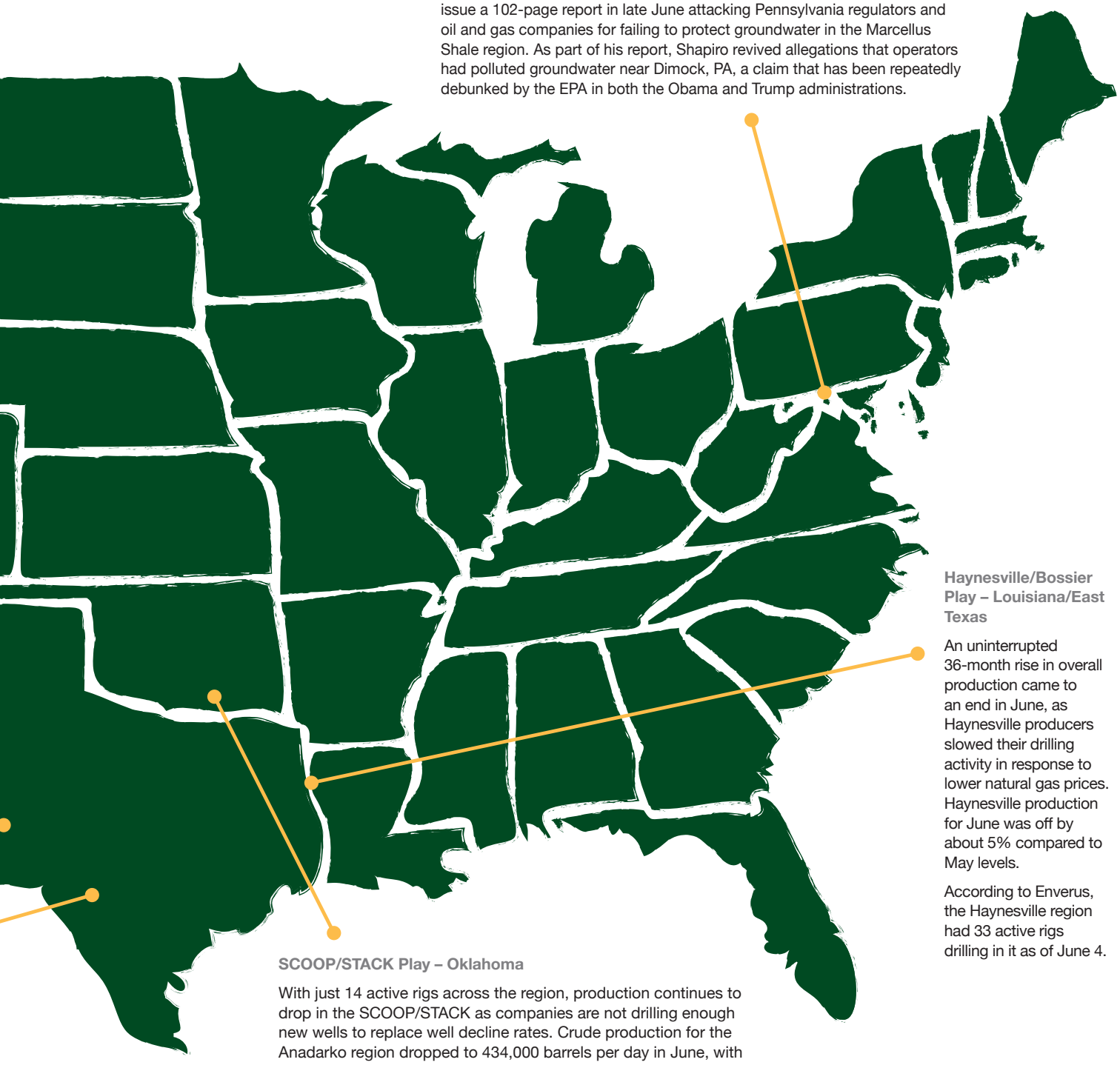
Eagle Ford Shale – Texas

Baker Hughes pegged the number of active rigs in the Eagle Ford as of June 24 at just 11, a drop of 85% from a year earlier. This is not all that surprising given that, during the final week of May, the Railroad Commission received just a single application for a permit to drill an Eagle Ford well, from EP Energy.

Chesapeake Energy, once one of the most active drillers in the Eagle Ford play during its boom times, filed for Chapter 11 bankruptcy protection on June 29. Chesapeake joins EP Energy and Sanchez Energy as formerly active Eagle Ford operators now in bankruptcy.

Marcellus/Utica Shale – Pennsylvania/West Virginia/Ohio

Activist Democrat Attorney General Josh Shapiro convinced a grand jury to issue a 102-page report in late June attacking Pennsylvania regulators and oil and gas companies for failing to protect groundwater in the Marcellus Shale region. As part of his report, Shapiro revived allegations that operators had polluted groundwater near Dimock, PA, a claim that has been repeatedly debunked by the EPA in both the Obama and Trump administrations.



Haynesville/Bossier Play – Louisiana/East Texas

An uninterrupted 36-month rise in overall production came to an end in June, as Haynesville producers slowed their drilling activity in response to lower natural gas prices. Haynesville production for June was off by about 5% compared to May levels.

According to Enverus, the Haynesville region had 33 active rigs drilling in it as of June 4.

SCOOP/STACK Play – Oklahoma

With just 14 active rigs across the region, production continues to drop in the SCOOP/STACK as companies are not drilling enough new wells to replace well decline rates. Crude production for the Anadarko region dropped to 434,000 barrels per day in June, with natural gas falling to 6.5 bcf per day. Those numbers compare to January production levels of 553,000 bpd and 7.5 bcf per day.

About the author: *David Blackmon is the Editor of SHALE Oil & Gas Business Magazine. He previously spent 37 years in the oil and natural gas industry in a variety of roles — the last 22 years engaging in public policy issues at the state and national levels. Contact David Blackmon at editor@shalemag.com.*

The Undelivered Promises of Climate Action Plans Adopted by U.S. Cities

By: **Mike McKenna**

A rash has been spreading across Texas cities. Its recent victims have included Austin, Houston, and, most recently, San Antonio. This disease is worse than most, primarily because it encourages magical thinking, triviality and rhetoric in the place of calm, sober, clear-eyed thought.

These Texas cities are now among many nationwide that have endorsed the notion of having zero carbon emissions by 2050. In some instances, they have explicitly and inaccurately linked that goal to the 2016 Paris Accord, which, to be clear, not only set no such goal, but didn't even mention it.

That goal came from a 2018 report by the United Nations' Intergovernmental Panel on Climate Change that concluded that the planet would need to reduce greenhouse gas emissions to zero by 2050 if there is to be any chance of holding post-Industrial Revolution temperature increases in global average temperatures to 1.5° Celsius (leaving aside that global average temperatures have been both warmer and colder prior to the Industrial Revolution).

It's not a promising start when right out of the gate you are confused about the provenance of your goal.

It should therefore probably come as no surprise that they are equally uncertain about how they intend to reach their goals. If you asked the mayor of Houston how he planned to make a city of 4 million souls carbon dioxide-free by 2050, he would have no idea.

I don't blame him; I have no idea either. Neither does anyone else.

So, why set the goal? And why this goal?

That is a more comprehensible story. The environmental community has been stuck on the issue of global warming (or climate change—they're interchangeable) since the late 1980s. By stuck, I mean they are unable to move away from it and unable to make any progress on it either with respect to public opinion, or with respect to the imposition of a new regulatory regime, or more importantly for them (I assume), with respect to actually reducing emissions.

Let's take them one at a time.

Public opinion, priorities, and willingness to pay

Despite what you may have heard or read, public opinion on this issue has been remarkably consistent and static for almost 30 years. Voters consistently rank climate change at or near the bottom of their priorities. Not surprisingly, they are consequently resistant to the idea of spending any money on "solving" or "addressing" climate. When asked in a recent nationwide survey of likely voters conducted by MWR Strategies on behalf of the American Energy Alliance how much they would be willing to be pay to address climate change, the median answer was $20 a year. That is a bit lower than the typical response which has ranged from $35 to $50 over the last few years (the current economic anxiety pops up in all kinds of places).

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THE TRAGIC THING IS THAT THESE GOALS, EVEN IF THEY COULD BE MET, WOULD HAVE NO EFFECT AT ALL ON GLOBAL AVERAGE TEMPERATURES, GREENHOUSE GAS EMISSIONS, SEA-LEVEL RISE, HURRICANES OR ANY OF THE OTHER THINGS THAT MAY OR MAY NOT BE EXACERBATED BY CLIMATE CHANGE

Place this next to former Vice President Biden's proposed approach to address climate change, which he estimates would cost $1.7 trillion (about $5,500 for each and every American), or his campaign advisers' approach, which would cost, by their estimate, $16 trillion (about $50,000 for each and every American), and you have some sense of the disconnect between what voters are willing to pay and what activists think they should be prepared to pay.

International efforts

Similarly, efforts to effectuate meaningful international constraints on greenhouse gas emissions have also been marked by stasis (and failure). The 1993 Kyoto Protocol was a failure. The Paris Agreement was not so much a failure as a failure to try. The core of the agreement was a simple recitation of what each nation pledged to do with respect to climate change, ostensibly focused on reducing emissions to the point where increases in global average temperatures above pre-industrial levels would be less than 2° Celsius.

Leaving aside the troubling and foundational fact that "pre-industrial" temperatures have been both warmer and colder than current temperatures, Paris included no enforcement mechanism and no ability to hold nations accountable. China and India even leveraged the anxiety of the Europeans to have an agreement, any agreement, that they promised to keep increasing emissions until 2030, and then maybe, possibly, if they weren't too busy with other priorities, think very carefully about reducing emissions at some point in the future.

Even those nations who made commitments to actually reduce emissions have been less than aggressive on their follow-through.

The United States and the United Kingdom have done better than most, with emissions flat or falling for the last few years. China's emissions have soared, and they have about 120 gigawatts of new coal-fired power plants planned, so that probably won't change. The EU as a whole has done okay but not great. The United Nations tut-tutted everyone back in November, noting that the rate of pledged (not achieved, just pledged) emissions reductions would need to triple to maintain any hope of limiting the increase to 2°.

This year, mostly because of the economic downturn caused by the ruinous response to the coronavirus, greenhouse gas emissions will probably fall by 2-4%, which is woefully short of the annual reduction of almost 8%—that's 8% reduction every year—that the more energetic activists say we need to maintain fidelity to the Paris Agreement.

Perhaps some context would be useful. In 1992, the world emitted about 22.2 billion metric tons of carbon dioxide equivalent. In 2019, the most recent year for which there is data, the world emitted about 36 billion metric tons of carbon dioxide and its equivalents, and, to the extent emissions have been minimized, it is because of the widespread substitution of natural gas for coal in the United States.

(continued on page 18)

Similarly, in 1985, about 80% of the world's energy was met by traditional, affordable oil, coal and natural gas. In 2019, about 80% of the world's energy was met by traditional, affordable oil, coal, and natural gas.

In short, attempts to impose meaningful restrictions through some sort of international regime have failed. Mostly because people (and therefore governments) prize things other than greenhouse gas reductions.

The federal government

How about the federal government?

Despite 30 years of debate, Congress has yet to pass any coherent, systemic legislation addressing climate change. Instead, we have a hodgepodge of regulatory efforts (mostly tangential), spending on research and development (anywhere from 8 to 30 billion dollars a year, depending on how and what one counts), tax credits to wind and solar companies and for carbon capture and storage.

It's not for lack of effort. In the 1990s, Congress tried repeatedly to pass meaningful comprehensive legislation with respect to climate change. As recently as 10 years ago, legislation focused on a cap and trade approach actually passed the House of Representatives, but by such a small margin that the Democratic-controlled Senate never even bothered to bring it to the Senate floor.

The regulatory route has been similarly halting. The most recent attempt, the Obama administration's Clean Power Plan, was enjoined by the Supreme Court almost immediately upon its completion, and was completely rewritten by the Trump administration.

If you think about public opinion for a moment, the lack of forward momentum (or even sideways momentum) on this issue with respect to the federal government is understandable. Very few voters prioritize this issue, and their willingness to pay anything for it has been durable across time and circumstances. At the same time, well-financed groups in the national environmental movement want something done in exchange for all the cash they've given to the Democrats over the years. For Congress, the answer is obvious – throw money at the problem, hope your donors are happy, but make sure that voters never see the connection between what they pay (taxes) and where that cash goes (for things they don't care about) under any circumstances. That's why talk about a carbon tax keeps getting more scarce.

Climate plans

Into this maelstrom of indifference and failure to make progress come the climate action and adaptation plans.

Given the lack of progress in the international arena, sclerotic federal attempts, voter indifference to the issue and hostility to associated costs, and the actual rise in emissions, what's an activist to do? The answer is clear. Set a goal that is far enough in the future such that no one currently in office will need to worry about it, vague enough that no one really understands the possible costs, but sturdy enough so that you can reference it anytime you have an idea that people might resist.

In short, you want to structure a goal that allows you to work steadily towards remaking society in segments rather than all at once.

These plans are, in essence, an end-run around the democratic process. By committing a jurisdiction to a goal that can then be used to drive specific actions, rather than being initially clear on the specific actions necessary to meet the goal, activists are seeking to hide the true extent of their ambitions.

GIVEN THE LACK OF PROGRESS IN THE INTERNATIONAL ARENA, SCLEROTIC FEDERAL ATTEMPTS, VOTER INDIFFERENCE TO THE ISSUE AND HOSTILITY TO ASSOCIATED COSTS, AND THE ACTUAL RISE IN EMISSIONS, WHAT'S AN ACTIVIST TO DO?

They also avoid that most lethal of answers in this arena, a tax on carbon dioxide. The last thing activists can tolerate is clarity on the part of voters as to what they are spending and what they are getting. A carbon dioxide tax, which is of course an energy tax in a different dress, is politically untenable.

Hence, a long-dated goal, with vague explanations of how it might be met, winds up being the best answer for the climate change activist.

Let's think about how such an approach might work in practice.

Now that Houston has been careless enough to throw in with the climate crowd, what is likely to happen in the next few years? There are three paths that will be traveled.

First, shortly someone on the City Council will want the city to get "100%" of its electricity from renewable energy. Lots of companies do it; lots of cities do it. But no one not already involved in these deals really understands them. Let's unpack how they work in practice.

Under a typical (simplified) deal, the city will contract with a renewable generator, which will sell all of its generation into the nearest market, and transfer renewable energy credits equal to 100% of the city's electricity demand to the city so that they can claim to be 100% renewable. The power from the renewable generator is never delivered to the city. It is dumped onto a power market that most times has a large amount of excess generation.

The power from the renewable generator does not match in time or location the actual electricity consumption of the city. Instead, the city simply buys primarily fossil-based power as always from its nearest generation source.

There's one last twist. If the power from the renewable generator receives more than the average costs on the wholesale market, then the city gets a credit for the difference. If it nets less, then the city owes more for their power than the market rate. So, essentially, the renewable company (and their financial backers) leverage taxpayers to underwrite and finance a big renewable project.

More importantly, the project will also add costs to all ratepayers in the region by increasing the costs to operate other plants on the system that will now be needed to integrate the must-take subsidized renewable power. It will also increase transmission and distribution costs that will be spread over all ratepayers.

The Massive Environmental Costs of "Environmentalism"

Second, folks will get it in their heads to attack the "real" problem, namely, that Americans in general and Texans in particular drive

too much and their automobiles are bigger than they should be. Houston's plan already calls for reducing vehicle miles traveled by city residents by 20%. How? You guys need to ride bikes more. You need to take more transit.

Beyond that, Houston already has in place an initiative to encourage the sales of electric vehicles. The city "leaders" want 30% of all new car sales in Houston to be electric vehicles by 2030. Leave aside the fact that all electric vehicles do is move emissions from one place (the tailpipe) to another (the power plant).

What happens if (when) it turns out Houstonians don't feel like riding bikes, taking buses or being told what vehicles to buy? We've seen that movie in places like Amsterdam, London and New York: privately-owned automobiles will be taxed for the privilege of driving and (as importantly) parking in certain sections of the city. Eventually, there will be serious attempts to ban internal combustion engines entirely. In this, as in other things, if you don't follow the program, there will be consequences.

What about your "clean" electric vehicle? Professor Michael Kelly at Cambridge has tried to quantify what electrification in the transportation sector might mean. He estimates that "current battery manufacturing capabilities will need to be in the order of 500-700 times larger to support an all-electric global transportation system. The materials needed just to allow the United Kingdom (about 65 million people) to transition to an electric transportation sector would require 200% the annual global production of cobalt, 75% of lithium carbonate, 100% of neodymium and 50% of copper. Now imagine those numbers 50 times bigger. Imagine them happening by 2050."

The materials demand just for batteries is beyond known reserves. Try to imagine the environmental impact of mining and transporting that volume of material. Think about the need for vast amounts of rare elements, far beyond known world reserves, as well as the incredibly huge amounts of materials that will be needed to recycle the batteries and other components at some point in the future.

That all is going to happen in the next 30 years? Without any environmentalists intervening to raise issues, litigate and otherwise slow down the progress?

Let's try to put that in perspective. The owners of the Keystone Pipeline have been trying for 12 years just to get one moderately-sized pipeline built from Canada to the Gulf of Mexico that would move considerably less than 1% of all the petroleum consumed on this planet each and every day.

Third, to deal with residential emissions there will be natural gas moratoriums. Dozens of jurisdictions have already considered such moratoriums as part of new construction building codes, and it is easy to imagine such an idea might spread. Leaving aside the enormous increase in demands for electricity in those places where natural gas meets most of the need for residential and commercial heating, such moratoriums would compromise entire industries, starting with the restaurant industry. Moreover, those moratoriums would (of course) damage those least able to pay for the associated increased costs – the poor, the elderly, those on fixed incomes.

Finally, while these plans for the electricity, transportation and heating sectors are byzantine, mythical and expensive enough, no one has yet articulated a plan to address carbon dioxide from industries like chemicals, cement, airlines, steel mills, whatever. Before agreeing to a goal, I might want to know what its effect might be on my industrial and employment base.

Undelivered Promises

The tragic thing is that these goals, even if they could be met, would have no effect at all on global average temperatures, greenhouse gas emissions, sea-level rise, hurricanes or any of the other things that may or may not be exacerbated by climate change.

The United States emits about 15-17% of all the greenhouse gas emissions on the planet—about 6.6 billion metric tons out of the worldwide total of about 36.8 billion metric tons of greenhouse gas emissions. That number has been fairly steady for a number of years, and consequently, the percentage has been dropping. China probably emits about 15 billion metric tons of greenhouse gases each year (numbers are always dicey with China). San Antonio emitted about 17.3 million metric tons of greenhouse gas emissions in 2016. Those 17 million tons are about a week's worth of the likely increase in emissions from China next year.

I didn't vote for the Paris Agreement. Neither did you. Neither did anyone in the United States. Voters in Houston or Austin or San Antonio did not vote for the climate plans they will now endure. At some fundamental level, the climate change activists need to shave their beards, come out of the caves and have a legitimate debate about what these ideas are, what they will do and what they will cost. Otherwise, we will be right back here in 10 years talking about how these particular climate plans were the latest in a long line of failures. Days of reckoning can be postponed, not avoided.

IF YOU ASKED THE MAYOR OF HOUSTON HOW HE PLANNED TO MAKE A CITY OF 4 MILLION SOULS CARBON DIOXIDE-FREE BY 2050, HE WOULD HAVE NO IDEA

About the author: *Michael McKenna is the President of MWR Strategies and a columnist for The Washington Times. He was most recently a Deputy Assistant to the President and Deputy Director of the Office of Legislative Affairs at the White House. He has worked in senior positions in a variety of government agencies at the state and federal levels. He has advised a wide variety of political and corporate clients with respect to government affairs, public policy issues, opinion research, and communications strategies. He has also worked on numerous campaigns and transition efforts.*

Mike has degrees from the University of Pennsylvania and George Mason University, and has been a Fellow at the Dole Institute at the University of Kansas and the Institute for Public Policy Studies at the University of Denver.

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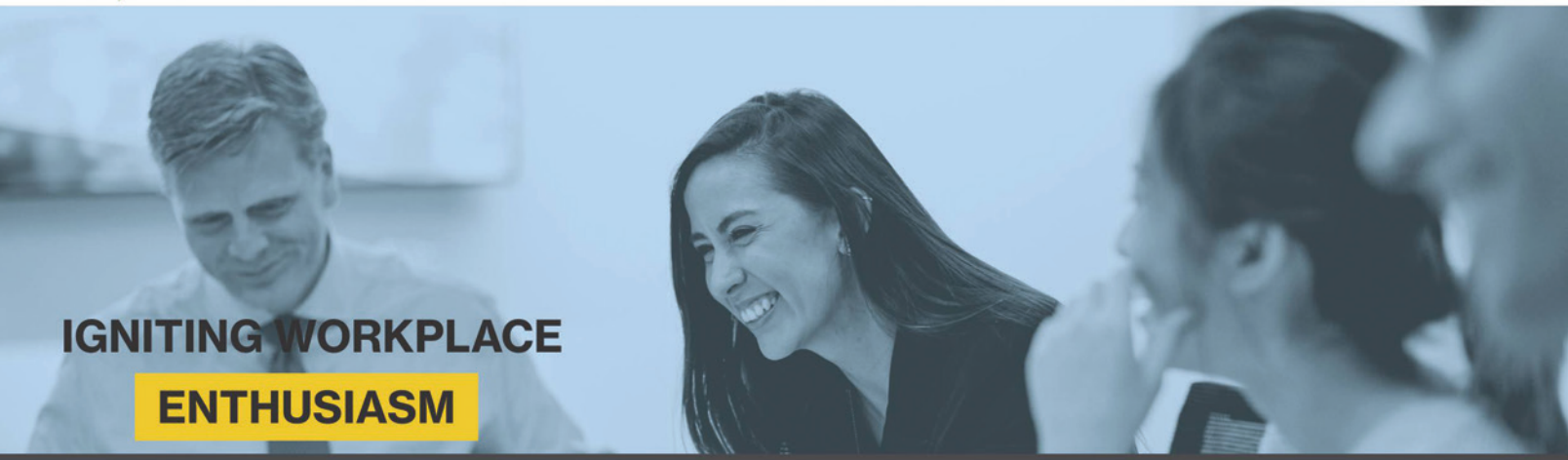

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COVER STORY

MIKE HOWARD

Knows His Priorities and Lives Them Every Day

By: **David Blackmon**
Photography by: **Michael Giordano**

AN ESSENTIAL BUSINESS IN THE COVID-19 ERA

"We are an essential business. Since we are providing low-cost abundant hydrocarbons to our customers, downstream and upstream, we are an essential business. We're the business that powers every other business. Without hydrocarbons other businesses don't operate, so we were designated essential."

It was mid-June, and I had just asked Mike Howard, the co-founder and CEO of Howard Energy Partners (HEP) to talk about the kinds of impacts his company experienced as a result of the COVID-19 pandemic that has swept the country and the world this year. It's a subject that has been a central focus of senior executives everywhere: How do we continue doing our business while at the same time making sure our workplaces are safe and our employees are protected?

In response to the crisis, Howard first defined his company's key goals and priorities and then put a plan into place focused on making sure the actions undertaken thereafter were designed to achieve them. It's a process he has repeated throughout his adult life.

One of the first actions Howard took was to create an internal COVID-19 task force that is responsible for monitoring the status of the pandemic, government advisories and mandates, and creating plans of action to not only ensure full compliance, but to go the extra mile to protect the health and safety of HEP's employees, contractors and customers. He told us during an interview on In The Oil Patch Radio Show a few weeks later that the task force still meets twice-weekly to ensure the company continues to meet these goals.

HEP operates in four states and in Mexico, and every one of those jurisdictions has created its own sets of guidelines and mitigation requirements related to the coronavirus. So, keeping an up-to-date handle on all of those various moving targets has been a challenge, as has ensuring that the company is living up to the high standards Howard demands.

Another complicating factor for HEP was the fact that most of its employees work in the field doing jobs that cannot be done from home. "Our field employees didn't have that option," Howard told us. "They had to come to work every day."

But there was also a bright side to that reality, which was the fact that, as Howard said, "they're by nature socially distant" due to the outdoor nature of their work. "So, about two-thirds of our employees have never stopped coming to work—they've been coming to work every day."

Like so many other companies, though, HEP has had its office employees working from home even though that has not necessarily been a requirement. But the company didn't just send out a memo one day telling them to stay at home – it went the extra mile to ensure they've been able to remain productive. "We implemented a work from home policy, even though we didn't have to, because people just worried about this. We set everybody up with computers, monitors, iPads, whatever could facilitate their job, and we've been 100% work from home since March.

"Now, we are starting to slowly migrate back into the office. We're monitoring the different numbers from the city, county, state, and national levels, monitoring all the

guidelines, but we're starting to practice coming back into the office here slowly but surely."

The results of all the planning and execution have been rewarding. "I'm really proud of the employees. We made that transition very quickly in the middle of a week, and we did not miss a lick. Our customers have not seen a blip in run time. We have flowed all of our contracted gas and oil and natural gas liquids. Our natural gas plants have been running. We've handled all these situations.

"And thank goodness we haven't had a positive case at Howard Energy yet. Even though we're in Mexico, the U.S, and in four different states, we've not had a positive case, thank God. We've had scares, but we feel very, very blessed right now. We can't just assume we're going to stay that way, but right now we feel very blessed."

Shortly after this interview, HEP had its first positive case. All procedures were followed, and they continue to closely monitor all employees.

GROWING UP IN SMALL-TOWN TEXAS

Mike Howard is a small-town Texas boy. Born in what he called "that little regional hospital on highway 59" in Beeville, he is one of three children raised in the tiny town of Agua Dulce by his mother and father, who was an Ag teacher at Agua Dulce High School.

He remembers that childhood fondly. "So, you know, it was growing up on a teacher's salary. We had everything we needed—we weren't destitute by any means—but what it really taught me early on is nothing's going to be given to me, and I have to work for everything that I do. So, it really provided the foundation for the more you work, the more money you make, the different life you can have if you choose to do it, and it really gave me that solid work ethic."

It was an ethic that started to pay off at a very young age. "For example, when I was 13 years old, I went and got my tractor driving certification so that I could drive a tractor during the summertime. Even though I knew how to drive a tractor, nobody would hire me to do it if they didn't think I was certified or good."

With his tractor certification in hand, Howard went to work for a local farmer during the summer between his 8th grade and freshman year in high school. While that was hard and hot work out in the summer South Texas sun, he quickly discovered that doing such work while his buddies were off swimming or fishing or playing baseball had its own rewards.

"I was making money," he said with a chuckle. "I could afford Nikes. They're running around in Chuck Taylor's, and I was wearing Nikes because I worked. So, that was a big lesson to me growing up in a small town. There are many other small-town values that you get, and I think they are really important, but from a work ethic standpoint, I think that is probably one of the biggest things that I was able to get out of that foundation."

Not that all of that hard work prevented him from being a part of his school's extracurricular activities: In a small town like Agua Dulce, many kids like Mike Howard develop a high degree of versatility out of necessity. "Being a 1A high school, I graduated with 28 people," he laughs, "So you can imagine on the football team you played offense and defense and kickoff and kickoff return and punt and punt return. Once you got on the field, you didn't get off in a small school.

"So, we played football, played a lot of basketball, and then ran track to get ready for football again," he continued. "Then in the summer times, we were out working in the fields doing manual labor. And that was really

WE'RE THE BUSINESS THAT POWERS EVERY OTHER BUSINESS. WITHOUT HYDROCARBONS OTHER BUSINESSES DON'T OPERATE, SO WE WERE DESIGNATED ESSENTIAL

an exercise of learning how to work in the heat to get ready for football two-a-days that would kick off in August."

Howard also had the experience that thousands of small-town kids all over the country have experienced: Many of the football players didn't even manage to get off the field during halftime. "Since we were a small school, to get enough people to play in the band at half time, some of us would take our shoulder pads off, strap our drums on or pick up our musical instrument and go out and march at halftime with our football uniform on. Then when the performance was over with, we'd strap our helmet back on and our shoulder pads, and go back to playing football."

He paused to laugh again before finishing by saying, "Small town life." Absolutely. Nothing like it.

COLLEGE: A GATEWAY TO FUTURE SUCCESS

The work ethic and high degree of versatility Mike Howard developed during his early life have characterized his adult life as well as has his goal-oriented outlook on life. His small-town values and learnings followed him into college life at Texas A&M Kingsville, where he put himself through college in just over four years by taking heavy loads in the spring and fall semesters while continuing to work part-time while in school and full-time during the summers.

He managed to do all of that while also commuting the 23 miles back and forth between the two towns.

"I didn't have your standard college experience," he said in an understatement. "I worked. I put myself through college. So, I worked 20 hours a week at different jobs, and I went to school and averaged 18-21 hours a semester. That way, I could take my summers off and work, and make enough money to come back to school and pay for my college and my living."

Howard wasn't just majoring in basket weaving or some other throwaway field of study. He had decided he wanted to be a chemical engineer and work in the oil and gas business. In our interview, we talked about one interesting aspect of Agua Dulce, which is that it has long been a major South Texas trading hub for natural gas, due to its being a crossroads for a number of major pipeline systems.

But as Howard noted, it is an aspect of the town that even many of the people who live there never become aware of. "What's funny is that if you're in the natural gas business you've heard of Agua Dulce," he said. "You couldn't point to it on a map, but you've heard of it, and you know that natural gas trades around it. It's been a hub for many, many years. But what's interesting is when you're from Agua Dulce, you probably don't know that. You don't know there's a natural gas hub right outside of town. You know where Highway 70 and Highway 665 cross, but you wouldn't know that there's a hub because everything is buried underneath the earth. You don't see that a large trading hub is right there."

But Howard knew it, and his early understanding of his surroundings helped to create a budding interest in the business. And that interest, in turn, made him anxious to get through college so he could start a ca-

reer. "My memory of college—and gosh, you know, Kingsville doesn't have a lot of social activities," he told us, laughing. "But as a farmhand, I was making $6/hour driving tractors, and my first engineering internship I made $13 an hour, and I thought I was rich! And I said 'I've got to get this engineering degree.'"

Thus, while so many of his fellow students focused on drinking beer, social life and personal fulfillment in their college life, Howard was focused on taking advantage of what he viewed as a means to an end. "I was in engineering clubs and that sort of thing, but I remember college to be a gateway to opportunity. I wasn't concerned with things like fulfillment and higher purpose like I am today. Back then it was about "what can I do to dig myself out of this life of being a farmhand?"

His focus on that overarching goal in fact led to Howard's choice of a major. "I knew that if I graduated as a chemical engineer that would get me the highest salary of any degree I could get from Texas A&I (later called Texas A&M), that was the highest salary I could get, that quite honestly is what I was going for at that time — getting an advanced degree to do something else with my life. My college experience was very focused, and I graduated in four years and one semester."

MOVING INTO A CAREER

As it happened, that first internship during college — with a company called Union Pacific Resources — led to Howard's first job in the industry following his graduation.

"Union Pacific Resources had an oil field right there in Agua Dulce called the Stratton Field, and they had a natural gas processing plant sitting on top of that Stratton Field that I went and worked in as an intern," he told us. "I was kind of a roustabout. I wasn't doing engineering work, I was just doing whatever needed to be done. And it was great because I was able to start getting experience around pipes, and processes, and hydrocarbons, that sort of thing. I worked there 20 hours a week, and then when I'd got to school, I was able to apply some of the principles some of the textbooks were giving me to the real-world application of what was going on in the field."

Obviously, leadership at UPR at the time was impressed with what they had seen in their young intern. "So, they offered me a full-time job. And it was really a benefit and a blessing because during my first 5 years, I moved into their Austin Chalk Play in East Texas, where they were doing horizontal drilling for rich natural gas. During that time, we built five brand new cryogenic gas plants from the ground up. That gave me a lot of experience in high-performance teamwork. We were hiring people, training them on these plants, all the way from construction to start-up operations to all the hassle it takes to start a facility up in the field, while being with an oil and gas company that was very aggressive for that time period.

"And being an operations guy—being in the field, turning valves, working nights, holidays and weekends—we worked seven days a week many times, to the point at which it just felt normal to do that. When you start your career like that you learn to have respect for your co-workers, you learn to be able to communicate with people who are working in the field. At the same time, I was giving presentations to executives, learning all of the safety regulations, government regulations, engineering codes—you really get a lot of experience. I really attribute my future success again to a strong foundation of the fundamentals of the midstream business, and it really came from that first job."

Howard's performance in that first job quickly convinced the company to put him

HOWARD'S PERFORMANCE IN THAT FIRST JOB QUICKLY CONVINCED THE COMPANY TO PUT HIM INTO LEADERSHIP ROLES. AT THE AGE OF 26, HOWARD SUDDENLY FOUND HIMSELF MANAGING A STAFF OF OVER 100 EMPLOYEES

into leadership roles. At the age of 26, Howard suddenly found himself managing a staff of over 100 employees. He chuckles at that memory, ruefully pointing out that "I was actually my youngest employee."

But in the business world, those with true leadership skills tend to stand out from the crowd regardless of age; thus, management decided to put Howard in charge of managing the same natural gas processing plant and gathering system at which he had interned during college. Being the young guy atop an organizational chart filled with experienced employees, some of whom had been with the company and in the industry for more than 20 years.

"I was familiar with a lot of those employees, of course," Howard said. "You learn very quickly management skills to inspire others to get to a goal that you can only achieve with their skills and talents. You have to convince them that that's the thing to do. I learned very early on to tell people 'I don't know what you know. I don't know as much as you know. You have 20 years of experience — you might even have more years' experience than I have years of life. But I need your help here. I'll make sure the company gives you the tools, but we need to accomplish this task.' That was another real foundational building block for me."

From there, Howard continued to move up in management at UPR and its successor company, DCP Midstream. But as DCP continued to grow, the layers of internal bureaucracy kept multiplying, a very common phenomenon in the corporate world. But spending more and more time trying to navigate through those layers of bureaucracy means that managers end up spending less and less time focused on the real work of the company. Not surprisingly, an action-oriented guy like Mike Howard grew weary of that.

"I really started feeling that there was more bureaucracy than I could really take, to be honest with you," he told us. "I wanted to work for a smaller company that was more nimble—more of how I felt early on in my career. So, I left that big company and went to a smaller company called Crosstex Energy. What's interesting is that Crosstex Energy at the time I went to work for them was probably about the size of Howard Energy today. So, I was elevated to vice president, and I left the field and left steel toe boots and blue jeans and went to work in Crosstex's Dallas office. That was a big shift going from the field to an office every day."

SETTING YOUR PRINCIPLES AND THEN LIVING THEM

But just a year and a half after going to work for Crosstex, an even bigger opportunity came Howard's way, this time from Kelcy Warren, the CEO of Energy Transfer. Howard calls that job "transformational."

"That would've been 2005, so I was probably 31 or 32 years old," Howard told us, "and I said, 'You know Kelcy, I only have this much experience doing this.' And he said 'No, I believe you can do it. I did it, I believe you can do it.' So, he offered me the Chief Operating Officer job at a very young age.

"I had that job for five and a half years, and we accomplished such big things. We did over $7 billion in organic projects. We laid the first

42-inch-high pressure natural gas pipeline in the state of Texas, which was such a big deal. Now, you hear about 42-inch pipelines in the country all the time, but in 2005, that was the first one. Then to do $7 billion in projects—Howard Energy has not done $7 billion in 9 years of our existence. I had 1200 employees, I think, when I left there. What a big job."

Indeed it was, but it was a big job that took a toll on Howard, and by 2010, he had hit the wall. "I was worn out," he said with a laugh. "I didn't focus on putting enough tools in my toolbox to deal with the stress of running at that pace, and I didn't know what help to look for. I ended up burning out, and leaving that job with no game plan to do anything else."

Upon leaving Energy Transfer, Howard spent several months working with an executive coach and trying to figure out what to do next. Not that he was without opportunities — they kept coming to him whether he wanted them to or not.

"I was getting offered CEO jobs, I was getting offered moves to different cities, I was getting offered private equity — 'here's $500 million of commitment, go build a team, and go start a company,'" he told us. "What I couldn't get comfortable with is that every single one of those opportunities was somebody else's idea, somebody else's opportunity, and they didn't all meet my guiding principles."

Howard had developed his own set of personal guiding principles at the suggestion of his executive coach. "I had a lack of fulfillment," he said. "I mean, yes, I had name notoriety, I was making more money than I thought I'd ever make, I had everything going for me, but I'm like 'something is happening here where I'm just not happy, I'm just really unsatisfied.'

"He made me write down some guiding principles. Basically, I'd call it an exercise in creating your values. And I realized that I wanted to work for a meaningful endeavor. It didn't have to be a big company, it didn't have to be oil and gas — I just wanted it to be meaningful, whatever we were doing.

"I wanted to have ownership in the company. I noticed that people who had second homes or vacation homes and took big vacations had a paycheck, but entrepreneurs and those that had ownership in the company had ranches and had a little more freedom in their schedule. I didn't want to work around people I didn't want to be around. I wanted to choose who I'm around. I didn't want to work around jerks. I wanted to stay in San Antonio. That's very important."

He laughs. "I have avoided Houston my entire career, and that's hard to do in energy. So, I avoided Houston. I thought 'Man, if I could make a living in San Antonio, how cool would that be?' Because I love this town. It feels like a small town like I'm from, but it has all the amenities of a big city. So, I wanted to stay in San Antonio: That was very important to me."

Set now with his guiding principles in place, Howard spent the next several months working his contacts and evaluating opportunities. By the middle of 2011, he had all the pieces put together: Two major equity investors, a business partner to help guide him through the ins and outs and paper filings involved in forming his own business, and a set of initial assets ready to be acquired to start the new business. From all of that planning and networking, Howard Energy Partners was born.

"The original idea was to make this a fully integrated total solutions company that could design, engineer, and construct a midstream asset and then own and operate it," he told us. "We bought a construction

company and a pipeline company. They were both very small at the time, and then within 18 months of buying them, we grew from 350 construction employees to over 1,000 construction employees. It was wildly successful, except for the fact that the pipeline business only had 13 people, and we made the same amount of money with just those 13 people.

"That's when I decided 'Ok, you've never been in construction, you tried it. It's been fine," he laughs. "We sold the construction company, we took that money, and we put it all into pipelines and gas plants and midstream infrastructure, and we've never looked back. We decided we're not going to be a construction company anymore, and we shifted the fully integrated idea of the original Howard Energy to just being a diversified midstream company. We're going to own assets in different regions. We're going to own different kinds of assets from pipelines, to plants, to storage. And we're not going to go back to working construction again. That's how Howard Energy got started, and how the first year or two of the company went."

BUILDING A STRATEGIC BUSINESS

One of several strategic decisions Howard made early on was to focus on building and acquiring assets that would take advantage of the nascent shale boom taking place in the United States. In 2011, the Eagle Ford Shale just to San Antonio's south was in full boom, and Howard jumped on that opportunity with both feet. As things developed, he also leveraged his presence and knowledge of South Texas to become the first company to build a pipeline from the U.S. into Central Mexico.

"We were very fortunate in 2010 when I left Energy Transfer the Eagle Ford Shale was really just kicking off," he told us, "and I knew South Texas. I had operated all those pipes and gas plants in South Texas with DCP Midstream, so I knew South Texas. With our first acquisition being right on the western end of the shale play on the border with Mexico, you have a country down there with 128 million people that are starting to shift away from their traditional energy sources to new energy sources. So not burning wood and tires and fuel oil, they're actually starting to burn natural gas for power generation.

"Second, they've been drilling for oil and gas in South Texas for 100 years plus, they've been finding new reserves in South Texas for 100 years plus, and I think they'll be finding more reserves and drilling in South Texas for the next hundred years. And in South Texas, there's multiple levels of play. They can drill oil sometimes, they can drill lean gas sometimes, they can drill rich gas sometimes. And then you have this big shift in Mexico switching to natural gas, it's the perfect place to be in business. So that was a big strategy of ours."

Another shale play that was in full boom times in 2011 was the gas-rich Marcellus Shale region in Pennsylvania and West Virginia. Howard acquired three different midstream systems in that region as well during 2015.

"What do you have there? You have a big demand-pull there with Chicago, New York, with all the Northeast that uses a tremendous amount of natural gas. And then you have a play there that has just a tremendous amount of natural gas. They've been drilling there for over a hundred years, and they've learned now a new technique, and they're going to be drill-

WE LAID THE FIRST 42-INCH-HIGH PRESSURE NATURAL GAS PIPELINE IN THE STATE OF TEXAS, WHICH WAS SUCH A BIG DEAL. NOW, YOU HEAR ABOUT 42-INCH PIPELINES IN THE COUNTRY ALL THE TIME, BUT IN 2005, THAT WAS THE FIRST ONE

ing there another hundred years. So, that area hit our strategy of diversification first of all, not only in terms of customers, but product as well, because the Marcellus produces a lean natural gas, wherein South Texas it's oil, and a rich natural gas."

Over the past decade, everyone in the oil and gas business has looked for opportunities to get into the Permian Basin of West Texas and Southeast New Mexico, and Howard was no exception. "Then you look at our Permian Play is the same set of factors: They've been drilling there for a very long time, and there is a huge need for that oil in West Texas and we believe they're going to be drilling there for a long time."

Ultimately, one of the other major factors Howard looks for in assets is longevity — he and his company are in this for the long haul. "The way our capital structure works is we are long term," he said, "We have no intention of selling, we don't have an exit strategy, so being in these areas for the long-term is very much our strategy. It's been very deliberate in how we've been executing that strategy for the last nine years."

One big way Howard has diversified has been the acquisition and building of multi-modal port and hub facilities. The company operates four such facilities in Texas alone: in Three Rivers and at the Gulf of Mexico ports of Port Arthur, Brownsville and Corpus Christi.

We started our discussion about those facilities by noting that rail plays a big role at all of them.

"The rail is important," he told us. "What it does is it facilitates the transfer of product into and out of our pipeline systems or our storage systems. So, while we don't carry any of the product on the rail, our customers do.

"The rail is used by our customers just like a pipeline into a facility is used by the customers, so we have to provide that kind of transportation. For example: in Port Arthur, it is the way that we get product into and out of that area mostly for diesel and gasoline going to Mexico. Mexico has a tremendous amount of rail cars, and that's how they get a lot of their product into their country.

"Same way with Corpus Christi. We bring diesel in by barge or by pipeline, and then we transfer it onto a rail to go into Mexico.

"Then in Brownsville, we have a couple things going on. We have lube oils and waxes being imported through our facility and being exported through truck and rail. Then you have fuel oil, these oil refineries in Mexico produce fuel oil that they have no use for in Mexico. So, they actually import it into the U.S., and we bring it in by rail, and then we put that on a ship. So, having rail really helps our midstream business at each of these facilities, because it helps our customers do what they want to do with their product."

At its Port Arthur facility, Howard plays a significant and innovative role in facilitating the ability of refineries to manufacture all of the winter blend and summer-blend gasoline mixes that are mandated by the EPA under the Clean Air Act.

Howard became animated when we asked about that facet of his business. "We did a really unique deal with Total, the national oil company of France," he said. "They chose us as their North American partner to build a really world-class facility. What's unique about it is we can custom blend whatever they want to blend directly onto the ship. So, we have different components in these tanks, and we actually pump it onto the ship, and blend it as we're pumping which is very unique. A lot of people blend in their tanks in their facilities, and they wanted the capability to do it differently because they want to be able to meet the needs of whatever customer they're trying to satisfy.

"So, they contracted with us, and we built a really cool facility for them to be able to export different custom blend gasolines on the ships. And again, we're the company that holds the products in the tanks. We don't actually own the product. We're doing the work for them to transfer, blend, mix the product, but they own the ships and the transportation.

"It's absolutely a world-class facility. We studied one of their facilities in Europe to get our design, so it's a really cool place."

AS I COACH PEOPLE WHO COME TO ME FOR ADVICE, THE FIRST THING I TELL THEM IS TO CREATE YOUR VALUES, AND MAKE SURE YOUR CALENDAR LINES UP WITH YOUR VALUES

LIVING YOUR PRINCIPLES WITH HOME AND FAMILY

For Mike Howard, the small-town values he learned while growing up in Agua Dulce, as well as the personal guiding principles he developed with his executive coach, include the fact that, while career is important, home and family come first. When asked about that, he reflected on advice he gives to those who come to him looking for guidance in their own lives.

"As I coach people who come to me for advice, the first thing I tell them is to create your values, and make sure your calendar lines up with your values," he said. "You can't tell me that you love your wife and family, love exercise and love hunting, and then you go to your calendar and there's nothing scheduled on your calendar for those events, you just fit those in where you can because work takes up so much.

"I'm of the strong opinion that if your values include your family and your health, which if you're going to be successful both of those need to be in there, and time for friends, and time for travel, and time for work, it needs to be scheduled, and you live with that schedule. I always ask people "what are your values?" and then "show me your calendar" and so whatever you tell me your values are, I'll double-check you to see what your calendar shows that you're doing."

In his own family life, Howard positively glows when talking about his own wife. "Man, I have the best partner, Meredith; she's such a perfect partner for me. She's full of joy and happiness, and she's a business owner, too. So, she and I work to balance the busy life that we have, being able to keep people employed and run successful businesses and have successful children.

"We have three children, ages 4, 7, and 17. So they're all at different times in their life. Here recently we've been getting one her driver's license and one, teaching her how to use the bathroom by herself, you know. So, it's a pretty broad range of activities around our house, but it's so much fun.

"Meredith is a great partner for me, since I'm the one who tends to be more of the business, serious, engineer, logical thinking. She's the one who brings the fun and joy, thank God. Between us, we make a really good partnership.

"We love to travel. We have taken the kids anywhere from Mexico City, to Vancouver, Canada, to this past summer we went to South Africa on a hunting safari. It's really important for us to know that we're from Texas, and we think this is the center of the world, but that there is a big world out there, and we're not really the center of it.

"We've worked really hard to organize ourselves so that we can communicate our work and family schedules. One tool we put in place probably two to three years ago now, that has like just made our relationship go to a different level is, we put a really large calendar in our joint bathroom, and that calendar is front and center, so we know exactly where each other are going to be, where our children are going to be, what our next 6 months looks like, we can track each year what we're doing, and that has been a huge game-changer to us.

"Our calendars match our values, our calendars match our activities, and so there's never a question of what's coming up. Where before we were just kind of conversational about it, and it didn't work really well. It's really been fun to pay that particular tool forward to others.

Howard is also a hunter, and I asked him what particular kind of hunting is his favorite. It turned out that he has a hard time doing that.

"Man, that's a hard question, because I really enjoy being out in nature with a gun in my hand. Starting at dove season, when doves start in September through quail season through whitetail deer season, I enjoy all of it. Then as you go down the big game path, I've been down to Africa I think seven different occasions, different countries in Africa. I've been to Botswana, Mozambique, South Africa, Tanzania hunting big game, I really enjoy that too.

"What I've really become more focused on and passionate about is the preservation of wildlife through big game hunting. It's the best conservation tool because it's actually providing a job; it's giving value to the animals. Therefore the local population in Africa want to keep them, and they regulate them—it's a very highly regulated industry. I've really enjoyed learning about that. I usually take a videographer with me when I go to document the area that I'm hunting in, because so many areas are getting so overpopulated by locals, and they just decimate the wildlife through poaching. So I'm documenting quite a few of the areas so I can go back and show my children and grandchildren and say 'Look, here is what the Okavango Delta in Botswana looked like in 2011, here's what Tanzania looked like in 2017.' So, I'm really interested in that conservation aspect of hunting."

What about golf? We asked if he is a scratch golfer or is it just something he enjoys for recreation. As it happens, the other aspects of his life have taken priority over the game.

"As our younger children are getting to that really busy age, I have found that golfing is taking a backseat to everybody. So, I golf in order to conduct business probably six times a year, and that's about it."

GIVING BACK

Howard and his wife Meredith are involved in so many community activities that we asked him to give us the details on just one. Without hesitation, he chose his association with one of San Antonio's cultural jewels, the Witte Museum.

"Currently, just this red hot second, it's the Witte Museum," he said. "It's really a neat museum. It's kind of our natural history museum and kind of a history of South Texas museum. So, it's a really cool place. Meredith and I are the chairpersons for the 50th anniversary Witte Game Dinner. What's really cool about that is that is the primary money-raising event for the Witte operation. One hundred and fifty thousand school kids go through there a year, and this COVID-19 pandemic has really put a dent in their operating funds.

"So, this was supposed to be a layup year—'Oh yeah, you're the 50th chair, it sells out every year, 1,200 people can come sit in there,

do a big auction and all that.' Well, we've been turned on our head now, and that's obviously not going to happen. And what's interesting is when Mrs. [Ellen Schulz] Quillin started the Witte, she was going through the Great Depression back in 1934 before the game dinner was created—this was when the Witte was just getting off. She and four curators moved into the museum to try to keep it alive, and she would buy rattlesnakes from ranchers coming up from South Texas for 10¢. She'd skin them and fry them and sell them back to them as food for 25¢. Through that kind of activity, she kept the Witte alive during a really bad time in Texas history.

"So, we're kind of thinking about a similar type deal for this year's game dinner. It's going to be getting back to those roots of South Texas history because we believe the Witte needs to be a San Antonio institution, a South Texas institution. So, we're really having to get creative to create an event to raise enough money to keep the Witte going. So, that's a big focus right now of ours."

The Howards and Howard Energy are involved with and supportive of many of San Antonio's institutions and community endeavors, from the San Antonio Zoo to Texas BioMed to the United Way. From a personal standpoint, Mike Howard also works to give back to his alma mater in Kingsville.

"I'm really passionate about giving back to A&M Kingsville, because through my internship, through my degree, my gateway from a South Texas great foundation to what I have today, was through that university. I am on the board of trustees for the Texas A&M Kingsville foundation. We have an endowment there that we take care of—it's about $100 million. So, whatever I can do to help more South Texas kids get their education—it's a great way to become more economically mobile, through that university. Eighty-five percent of our graduates down there stay in San Antonio and south. So, it's a very important institution for South Texas."

Here we see that, in his personal life, as he does in his family life and his business life, Mike Howard sets his values and priorities and builds his calendar around them.

It's an extremely busy calendar.

About the author: David Blackmon is the Editor of SHALE Oil & Gas Business Magazine. He previously spent 37 years in the oil and natural gas industry in a variety of roles — the last 22 years engaging in public policy issues at the state and national levels. Contact David Blackmon at editor@shalemag.com.

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Cye Wagner, Chairman of the Board at the Texas Alliance of Energy Producers

By: **David Blackmon**

The Texas Alliance of Energy Producers is one of the most long-standing oil and gas industry trade associations in America, with a legacy that goes all the way back to 1930. With more than 2,600 current members, the Alliance is also the largest state-based trade association for this great Texas industry.

Cye Wagner, who leads her own long-standing family business, Fort Worth's Cooper Oil & Gas Company, stepped into the role as Chairman of the Board for the Alliance earlier this year. As such, she became the first woman to lead the 90-year-old association. I was able to catch up with Cye in late June and talk about her good fortune at having stepped into this high-pressure role at such an "interesting" time for the oil and gas business.

Question: Tell us about your background in the industry.

Wagner: I truly grew up in the oilfield. I spent more time on drilling rigs catching samples than anything else. I received my engineering degree from Texas A&M in 2008. While I was there, I really got to take advantage of all the wonderful internships that the department has as a requirement for graduation. I interviewed and earned internships for Burlington Resources and Chevron, and then EOG in the summers. I spent one summer working for my family's company. I tried, very purposefully, to see all sides of the industry and learn as much as I could and get a taste for what I wanted to do when I left. I was at EOG of course, in '07 at the height of the Barnett Shale. It was just too much fun.

Question: What did you do after graduation?

Wagner: I had a hard time deciding where to go after school. But the Barnett Shale was hopping, and in completion engineering at the time, the science that we were getting to use at EOG was just fantastic. So, I went into completions immediately following my internship and worked my way into production before I left. EOG has never been afraid of investing in science dollars, and if you had a solid theory that you could prove and test, they allowed you to spend that capital budget. Which is one reason why I believe they're such a successful company.

Question: So, you were there for almost two years, and then decided to go into the family business. How did that business get its start?

Wagner: My mom and dad built a true mom and pop startup—they've been in business for over 40 years. They drilled their own wells, and it was just the two of them. My mom left her job at the hospital to keep the books and run the regulatory side of the business. Dad is, just bootstrap, learned the business. He had an uncle that was in the business and got interested, and then started drilling his own wells in his 20s. Pretty much a true Texas wildcatter. They grew and developed over the years into a much larger and successful company.

Question: How did you make the decision to move over from EOG to Cooper Oil & Gas?

Wagner: I realized at that time that dad was hiring a lot of engineering firms to do things that I could do. I was about to get married and settle down, and I thought, "Oh, won't that be great? I could have a job at the family company and help that grow, and maybe have a little more flexible work schedule, and raise a family." And, of course, those things went out the window about the first, I don't know, 15 days of work. You put your own name on the door, and it was longer and harder hours than I had ever dreamed.

Question: What is the focus area of your business?

Wagner: We're pretty much an all conventional company. We have some horizontal wells, but

most everything we've done is conventional plays and production, mostly in the North Central Texas area. In the last few years, we've expanded towards the Permian and down towards the Gulf Coast. My husband works for us as well, he is also a petroleum engineer. He does the production and reservoir engineering. And my brother is a lawyer, in-house with us, and he manages all of our surface operations — he used to pump his own route growing up before school in the mornings. And I manage mostly the G & G side, drilling engineering along with accounting and regulatory. So, we wear a lot of hats, out of necessity. We run pretty lean, but that's kind of the difference between small shops and the big guys.

Question: So, tell us how you got roped into serving as Chair for the Texas Alliance.

Wagner: Our business has for many years been a member of the North Texas Oil and Gas Association (which merged with the West Central Texas Oil and Gas Association to form the Alliance), so I grew up going to North Texas Oil and Gas events. I have always had great respect for the Alliance for what they were doing, advocating for our industry. Obviously, coming into more of an operational, key leadership role in our company and seeing the target that's on our back. There's a lot of misinformation out there in the public. It's all the things that you've mentioned in so many of your articles and your press that's out there — we have a public in need for better, more accurate information. What you worry about then is if that misinformation is going to start drowning policy and regulatory efforts. Texas is a great energy-friendly and energy-rich state. We provide so much for our communities and our schools, and not just Texas GDP, but the United States. As you well know what oil and gas has done for the state of Texas and all of its communities, and to see that being attacked, it gets personal when you have a family company.

Question: I'm sure it does.

Wagner: We're very much stewards of the land and the environment. Clean water and air, and clean soil are crucial for the survival of a multi-generational business like my family has — we farm and ranch as well. When you see the press out there claiming how bad oil and gas is for the environment and all the different misinformation that's out there, somebody has to stand up and say 'Yes, there are some bad actors, and sure, accidents happen, and the energy industry, like any industry doesn't have a perfect track record, but this is what we do, this is who we are and the vast majority of us are good actors.'

We care, and I want the public to be educated. I want to entice young people to join this fabulous energy industry, and I want to make sure the legislative and regulatory efforts are positive. We need to be regulated, as any industry does, but that needs to be done with smart policy based on fact and science. So, the things that are very near and dear to my heart for my own personal family and business reasons are the exact ethos of the Texas Alliance, so it was a natural progression for me to get involved.

Question: What do you plan to focus on during your two years as Chairman?

Wagner: Education is key for me. Not only for educating the public, but also our policymakers and our regulators more about our industry — the good science, safety and innovation being employed today. This is the way to bridge the industry to them so that we can have effective policy and regulations. We will continue to accomplish this through our efforts in Austin and Washington, D.C.

When I was at A&M, I was involved in — and I still am involved in — The Society of Petroleum Engineers. We had a volunteer team in which we visited local elementary schools. We were able to teach kids about what petroleum engineering was, and we used that opportunity to talk to them about STEM careers. Seeing kids' eyes light up at the prospect of science and math and earth sciences and engineering and them going "Wow! There's a whole other world out there." And surprising them by holding up all of the petroleum by-products and saying, "this is how this gets made, and it takes all of these types of jobs and people to do this and to create this." That was exciting, and that strikes a real chord for my passion. Using my platform with the Alliance to entice young people and children to this industry will always be a focus of mine.

Question: The Alliance has always been a very effective voice in Austin. Do you plan to be down there frequently during the upcoming legislative session?

Wagner: I hope to. We are, as you know, in such good hands with our recent hire of our new President Jason Modglin. His experience is second to none, not only, of course, having worked in the legislature, but also at the Railroad Commission. So, he will be at the helm of our efforts, and he is the face of our organization. My duty as chairman of the board will always be to represent our membership and what's best for them. I was able to go down quite a bit as vice-chair and participate in a few things in Austin and D.C. and will continue to do so as much as possible.

Question: What's it like to be the first woman in this role? Obviously, that's not why you are in it, but it is notable, and I'm sure people do notice.

Wagner: It's still funny that sometimes I walk into a meeting, and people are shocked that I'm an engineer, or shocked that I'm running an oil and gas company. That perception of the makeup of our industry or the diversity of it is not always spot on. It's exciting to me to be able to represent the independent producers, and our membership has really grown — we have midstream, PE companies, large publicly traded entities and more.

So, just like you said, I'm not there because I'm a woman. I'm there because of my experience, my education, and hopefully my ability to successfully communicate on behalf of our board to the general public and to our regulators and legislators. That is why I'm there. I just happen to be a woman. So, I understand what you're saying. It is still refreshing to walk into those offices and to be heard and be listened to, again, because of my education and experience, not because I am a woman. But it is a good thing to show the diversity of our industry.

Question: Indeed, it is. Thank you for your time.

Wagner: Thank you.

For more information about the Alliance, visit www.texasalliance.org.

An Innovation Journey: Advanced Lead Batteries

By: **Matthew Raiford**

Innovation in lead batteries has been a constant theme in the long history of this technology. Lead batteries have served as the world's primary source of rechargeable batteries for more than a century, and their journey of innovation has been just as long.

From ushering in carbon-reducing start-stop technology, to advanced lead technology using additives to deliver increased performance for energy storage applications, the development of lead batteries has ensured it remains a critical technology in our world today, one representing 70% of the global rechargeable battery market.

The Consortium of Battery Innovation (CBI) is the world's only pre-competitive organization dedicated to advancing innovation in lead battery technology. As demand for clean mobility and clean energy continues to soar, the future will need batteries and lots of them. With their unrivaled safety, reliability and 99% recycling rate, lead batteries will play a central role in this future.

The ability of a technology to continue to innovate to meet changing technical requirements demanded by the sectors in which they are used is crucial. For the automotive sector, virtually every vehicle on the road utilizes a lead battery. For energy storage, lead batteries are providing reliable and cost-effective ways in which to store energy for small-scale microgrids to large-scale frequency regulation projects.

With over 100 members spread across the globe, from manufacturers and recyclers to materials suppliers, research institutes and end-users, CBI is bringing together knowledge and expertise that is driving forward research and innovation in the technology.

Last year, CBI launched a technical innovation roadmap identifying market-driven research goals for lead battery technology to secure future opportunities in key markets. By undertaking pre-competitive research projects aimed at delivering on these objectives, we aim to achieve significant performance enhancements for dynamic charge acceptance (DCA) and cycle life.

DCA is the ability of a battery to accept instantaneous charge, such as through regenerative breaking, and is an essential technical requirement for the hybrid automotive market, and we've set a goal of reaching 2 Amps/Ah by 2022.

Cycle life, which is the number of charge/discharge cycles a battery can perform before losing performance ability, is a key technical parameter for utility and renewable energy storage applications. Achieving 5,000 cycles by 2022 is our goal, a five times increase on current levels.

A range of research projects delivering on these specific goals are launched each year by CBI in collaboration with our global membership. From projects with leading universities such as UCLA visualizing the

(continued on page 41)

About the author: Matthew Raiford earned his B. Sc. in Chemistry from Texas A&M University in 2009 and his Ph. D. in Chemistry from University of Texas at Austin in 2014. Afterward, he started as a process engineer at RSR Technologies. Matt has spent the last five years working on materials development in active materials for lead batteries. He is focused on improving dynamic charge acceptance and cycle life in lead batteries and has pursued this goal by working with national labs, universities, and the lead battery industry.

PHOTO COURTESY OF MATTHEW RAITFORD

LEAD BATTERIES HAVE SERVED AS THE WORLD'S PRIMARY SOURCE OF RECHARGEABLE BATTERIES FOR MORE THAN A CENTURY, AND THEIR JOURNEY OF INNOVATION HAS BEEN JUST AS LONG

dynamics of carbon-enhanced negative electrodes, to collaborating with battery manufacturers and testing institutes to develop cheaper, lighter batteries with improved cycle life, power and energy density, CBI's research program is continuously establishing new ways for lead batteries to innovate.

The U.S. lead battery industry, a sector employing 25,000 people worth $26.3 billion is an industry leader in manufacturing and recycling, providing a sustainable solution for the nation's electrification and decarbonization goals. Recognizing the importance of lead battery technology, a ground-breaking project, organized by CBI with Argonne National Laboratory and the Department of Energy, is currently researching cycle life performance improvements for lead batteries using ultra-bright, high-energy synchrotron x-ray beams.

The automotive sector represents more than half of the market for lead batteries. Advancements such as these allow today's lead batteries to provide better fuel efficiency in micro-hybrid and start-stop vehicles, with the start-stop vehicle fleet allowing for over 4.5 million tons of CO_2 savings in the U.S. alone.

Demand for battery energy storage is booming, and utility grid storage is a key focus area for lead battery development. The past decade has seen significant increases in lifetime for these applications, and this high-performance combined with low acquisition cost per kWh and high and economically profitable recyclability means lead batteries are a fantastic energy storage solution. Developments in battery technology such as lead-carbon, enhanced flooded batteries (EFB), absorptive glass mat (AGM), bipolar lead batteries and the UltraBattery® all deliver enhanced performance, particularly at partial state-of-charge (PSoC), which is key for the diverse range of energy storage applications.

CBI's 2020 request for proposals has recognized this energy storage boom, and we're seeking research bids focused on facilitating the latest understanding in energy storage applications such as microgrids for renewable energy, load following for electrical grids, and demand response for commercial and industrial applications.

The future will require a range of technologies to deliver on clean energy and clean mobility targets. And this future will require batteries that continue to innovate and develop as technical requirements evolve and demand continues to soar. Lead batteries, an innovative technology combining high-performance, safety and sustainability, are ready to grasp these future opportunities.

Industrial Electric Gas Boosters Promise Quieter, Cleaner, Hassle-Free Operation in Oil and Gas

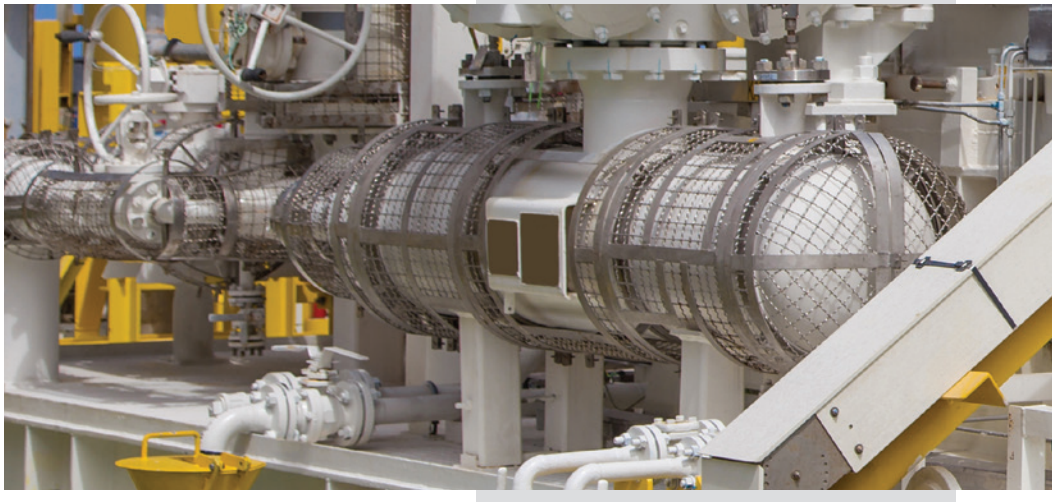
By: **Del Williams**

In the oil and gas industry, gas boosters are ubiquitous products working hard and with little fanfare behind the scenes to pressurize liquids and gases to several thousand bar (30-50,000 psi) for leak testing of vessels, valves or piping; charging gas-operated actuators; and high-pressure gas transfer, cylinder charging and scavenging.

Whether utilized as standalone devices or in larger OEM equipment, gas boosters are integral components in many offshore and onshore oil, gas exploration, development, storage, refining and processing applications.

Unfortunately, traditional pneumatic and hydraulic gas boosters have some inherent limitations. Pneumatic (air-powered) units work well to boost pressures at intermittent, low-flow rates, but are extremely noisy during operation. At higher flow rates, the sound is further increased, since multiple units must fire in parallel. This also increases the amount of electricity required. Hydraulic-powered units, on the other hand, are more suited to continuous operation and are slightly quieter than pneumatic options, but come with the potential risk of hydraulic oil contamination of the gas, hydraulic oil leaks and spills.

Now, a new category of advanced electric gas boosters is promising to provide quieter, cleaner, high-pressure, high flow rates up to 6,500 psi – along with improved monitoring and controls for a variety of oil and gas applications.



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Gas Boosters in Oil and Gas

Gas Boosters are used to test systems and custom-built OEM products in order to certify that these products meet the exacting standards of the oil and gas industry. The list of gases typically pressurized includes argon, nitrogen, oxygen, hydrogen, helium, carbon dioxide, liquefied gas and many other specialty gases.

One major application in the oil and gas industry is leak testing using nitrogen to ensure the integrity of pressurized systems. Anything from relief valves, pipe spools and small pressure vessels are tested with nitrogen gas to prove they are leak tight before being put into service on gas production facilities.

Gas boosters can also be used for high-pressure leak testing of underwater Christmas trees and other subsea installations to ensure hydrocarbons do not leak from the structure and risk contaminating the sea or creating a fire explosion. Helium gas is used at pressures up to 2,000 bar (30,000 psi) because of its leak searching capabilities, particularly in detecting porous castings.

About the author: Del Williams is a technical writer based in Torrance, California. He writes about health, business, technology, and educational issues, and has an M.A. in English from C.S.U. Dominguez Hills.

For more information, call (818) 843-4000 or visit www.haskel.com

Sulphur hexafluoride (SF6) can also be used in leak detection gas.

In addition to leak detection, gas boosters are ideal for nitrogen gas generators, enabling storage within high-pressure gas cylinders, charging nitrogen-filled accumulators and pulsation dampeners and in conjunction with hydraulic power units.

Quieter, Cleaner, More Efficient

Perhaps the most significant drawback of pneumatic and hydraulic industrial gas boosters is the sound levels produced during operation. In some cases, many multiples of the units are used in parallel, particularly when higher flow rates are required. The combined noise generated can be excessive.

"Pneumatic-driven gas boosters are extremely loud during operation, and even louder if multiple units work in parallel, which can make complying with OSHA regulations related to sound levels in the plant more difficult," says George Volk, Global Director of Sales and Business Development at Haskel, a division of Ingersoll Rand that manufactures gas/liquid transfer and pressurization technology.

According to Volk, the operation of typical air-operated and hydraulic-driven gas boosters can exceed the 85-dBA threshold and require sound protection in order to satisfy OSHA requirements. In fact, OSHA requires employers to implement a hearing conservation program when noise exposure is at or above 85 decibels averaged over 8 working hours, or an 8-hour time-weighted average.

Hearing conservation programs strive to prevent initial occupational hearing loss, preserve and protect remaining hearing, and equip workers with the knowledge and hearing protection devices necessary to safeguard themselves. Under OSHA's Noise Standard, the employer must reduce noise exposure through engineering controls, administrative controls, or Hearing Protection Devices (HPDs) to attenuate the occupational noise received by the employee's ears to within levels specified.

In contrast, advanced industrial electric gas boosters such as the Q-Drive, which is scheduled for release in early 2020 by Haskel, is much quieter (<77 dBA) during operation, while still offering up to 6,500 psi for high-pressure applications.

"This eliminates the need for regulatory scrutiny, along with hearing conservation programs," says Volk. "The use of the electric units can also streamline production, since workers can spend more time in the vicinity without worrying about exceeding the regulations or potential hearing loss."

INNOVATIVE ELECTRIC-POWERED UNITS OFFER HIGH-PRESSURE, HIGH FLOW RATES ALONG WITH ADVANCED CAPABILITIES BEYOND TRADITIONAL PNEUMATIC AND HYDRAULIC UNITS

In addition to the noise produced (even though it is less than air-powered units), there can be some concern that hydraulic gas boosters might leak or spill hydraulic oil. This can be a deterrent for applications that mandate a certain level of cleanliness

"Whenever you have hydraulics, there is the potential for leaks or spills," explains Volk. "That is essentially the reason the automotive industry moved away from hydraulics in their production line – because of the potential contamination issues."

Electric energy consumption is also a concern. Despite being electric-powered, the more advanced units are more energy-efficient than both pneumatic and hydraulically driven boosters.

"Compared to pneumatic gas boosters, advanced electric units use one-third of the energy and offer flow rates 10 to 20 times higher," says Volk. "Compared to hydraulic boosters, the electric units also provide energy savings due to lower cooling requirements."

Although there are several electric-driven gas boosters on the market, even within the category there can be significant design differences. Some of the early market entrants are designs that employ a gearbox to convert the rotary motion of the motor to reciprocating, which increases complexity and the amount of maintenance required.

More advanced units are built using a simplified linear servo-electric actuator drive which enhances reliability and reduces the Mean Time Between Failure (MTBF).

Both pneumatic and hydraulic gas boosters can also be difficult to control with much specificity, which makes their operation less efficient. Today's more advanced units include sophisticated remote and self-diagnostic capabilities. Units such as the Q-Drive come with human machine interface (HMI) and touchpad control to allow operators to monitor and control pressure and temperature closely and easily change setpoints.

Given the inherent drawbacks of pneumatic and hydraulic gas boosters, Volk believes quieter, cleaner, easier operation of electric-powered units will have considerable appeal for oil and gas applications.

"With the considerable R&D investment in these more advanced electric gas boosters, many of the shortcomings of pneumatic and hydraulic units have been resolved and this opens up new possibilities for oil and gas applications at high flow rates and pressures," concludes Volk.

This is a revised story also published by EngineerLive.com.

Managing Sand Production in Shale: *An Overview*

By: **Vikash Dixit**

As menacing as it may be, sand is often required during hydraulic fracturing (fracking) operations. With no alternatives typically available to serve as a proppant, sand is generally utilized along with water to prop open underground fractures for purposes of bringing oil and natural gas to the surface.

The unwanted flow back mixture that sand can cause, including a combination of water, debris, and hazardous chemicals, has created difficulty among hydraulic frackers for more than 70 years — from impairment of surface piping and hazardous leaks to lost time and revenue, and it has been a burden in general to fracking much longer than that.

The need to manage sand flow back, which can accumulate significantly, becomes critical for the successful harvesting of oil and gas, as well as for protecting the environment and those who are conducting the work. Mismanagement of sand while on the job can necessitate frequent cleanups of equipment and the workspace, which results in more downtime and lost production. In order to minimize these negative consequences, appropriate process management can go a long way toward improving the bottom line and having a positive environmental impact. A willingness to take a holistic approach to fracking is ideal for avoiding common complications and maximizing effort.

Common complications and mistakes

Some may be surprised that fracking dates back to at least the 1860s. But, it wasn't until the 1940s that the practice of hydraulic fracturing actually began as an experiment, followed by the first commercially successful application in 1950.

Some of the commonly occurring mistakes, however, have been timeless and associated with the tendency to try collecting as much as possible in the shortest period of time. This practice is a misstep, often leading to high velocities in the piping. Especially in the initial phase of flowing, an abundance of sand that has been used for fracking comes back through the piping, which can cause erosion and corrosion. In addition, increased velocity often causes holes in the piping — namely in the bends, due to an abrupt change in the direction of flow. In this instance, sand impinges on the wall and creates a hole, which can lead to spills and/or fires. Surface production equipment damage, sand buildup, production deferment, reduction in processing capacity and added costs related to sand disposal are also consequences of the shortcuts that some have taken during the fracking process.

A holistic approach

The controversies associated with fracking are nothing new. While the validity of each can be debated, there are proven technical measures that mitigate the negative effects on the environment and society. In addition, there are operational and functional processes that make the job easier and improve the financial outlook of those in the industry.

Proactive mitigation of the issues faced while fracking can be accomplished in three general steps that are commonly overlooked:

1. **Controlling flow velocity to minimize erosion and corrosion in surface piping.** The secret here is to maintain the optimal, critical velocity in surface piping and equipment. Flowing at a higher velocity can lead to a higher rate of erosion. Erosion models based on industry standards, such as those established by API (RP 14E – Design & Installation of Offshore Production Platform Piping Systems) and other proprietary tools, such as those from DNV, can be used to calculate velocity limit.

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2. **Optimal sand separating.** This can be accomplished by installing high-pressure sand filters in the well flow line. The intent is to remove the majority of produced sand collected there. This will prevent having to manage sand in other surface production equipment, such as in the separators.

3. **Modifying internal design of separators.** For example, install additional sand weirs and sand flushing connections so that sand can be cleaned out while the separator is operational. This eliminates the need to shut down the separator, thus reducing downtime and deferment. Also, installing additional instrumentation in the separator helps to detect sand levels.

The positives to this methodology include minimized piping erosion and corrosion, less likelihood of hazardous exposure to workers and nearby residents, and long-term cost savings for those conducting the work.

There are cons to consider too. Generally, these are short-term tradeoffs that should be anticipated to develop into long-term positives. For example, additional equipment, such as sand filters, will increase costs and temporarily lower production, but the long-term goals should outweigh those considerations. That said, companies should conduct research and utilize trial equipment before deciding on a plan. While there is science behind this methodology, tapping into consulting and academia expertise is important too.

Managing the menace

A typical fracking operation can use 2-10 million pounds of sand, and approximately one to two percent of that sand will return to the surface. With a lack of control being the standard, the expectation should also be that the sand separator will stop functioning at some point, due to sand build up, because separating oil, gas and water from the sand is not sustainable for the duration of the job. Shutting down the separator is inevitable if proactive measures are not taken, as are real risks to safety.

Even though just one to two percent of the total sand used returns to the surface, in real terms it could be hundreds of pounds that must be managed and disposed of. If measures are in place, such as an upstream hydro cyclone sand filter, then less sand will go into the separator and a total temporary or permanent shutdown is less likely. When design modifications are made in the separator, even when sand accumulates, service can continue by running a hose occasionally for cleaning while operating.

Emerging trends and future implications

The following list of novel technologies could have interesting impacts on the industry's future:

- No-man entry tank cleaning technologies, including robotics such as Re-Gen
- Automated, mobile and modular, non-man entry oil tanks, such as the BLABO® system
- Online desanding systems, such as Altrad vacuuming
- Sand level detection technologies, such as Acoustic Sand Detectors
- Vessel sparging systems, such as Stork
- Vibrating fork technology, such as Emerson
- Flow testing services, such as TechnipFMC

Hydraulic fracturing requires a precise approach and a willingness to focus on long-term outcomes versus the short-term rush to collect. Holistic processes can mitigate common difficulties associated with the presence of sand, and trending modalities may help navigate the nuances of the strategies suggested in this article, which will go a long way to impacting businesses and the environment.

IT WASN'T UNTIL THE 1940S THAT THE PRACTICE OF HYDRAULIC FRACTURING ACTUALLY BEGAN AS AN EXPERIMENT, FOLLOWED BY THE FIRST COMMERCIALLY SUCCESSFUL APPLICATION IN 1950

About the Author: Vikash Dixit, P.Eng., is an engineering professional with 35 years of experience specializing in the upstream sector for the oil and natural gas industry. Adept in process engineering, flow assurance, discipline management, sour gas, offshore operations, production and drilling, he is a recognized industry expert who helps to improve processes and equip engineers with best practices. For further information, please email: Vikash_d@hotmail.com.

The Beginning of the End?

By: **Bill Keffer**

Crisis? What crisis? This year of 2020 is unlikely to be remembered as one that provided the world with perfect vision, as many might have anticipated, given what those numbers often represent. In fact, it is much more likely that 2020 will come to be seen as the antithesis of clarity and as one of the most disruptive, confusing, and difficult years in recent history. The most significant pandemic since the 1918 Spanish flu, the most destructive and disheartening urban rioting since the 1960s, and the most extreme economic crash since the Great Depression of the 1930s all came together to remind any who might have forgotten that, not only can we not anticipate what will happen tomorrow, but we are even more woefully without the ability to stop it from happening.

The abrupt, pervasive and persisting economic shutdown has, in turn, caused an abrupt, pervasive, and persistent—and steep—decline in demand for energy, especially oil and natural gas. Planes aren't flying, so no demand for jet fuel; people aren't driving, so no demand for gasoline; businesses are closed, so no demand for electricity; daily commerce is suspended, so no demand for products, including those made from petroleum. In April alone, U.S. petroleum demand was down 26.7% compared to March. That was the lowest demand for April since 1970—that is fifty years ago when the U.S. population and economic levels were significantly lower.

Such an extreme drop in demand, including the first-ever recorded negative market price for crude oil (West Texas Intermediate reached negative $40.32/bbl on April 20), has resulted in thousands of producing wells being shut in, frac jobs being suspended, plans to drill new wells being suspended, exploration budgets being slashed, employees being laid off, companies going bankrupt—and a lot of self-reflection and speculation about whether this might be a critical pivot point for energy policy, marking the beginning of the end for the oil and gas industry. That 2020 is also a presidential-election year only adds to the drama and uncertainty.

So, what will the pundits be saying this time next year? Will oil and gas still have not recovered, creating even more speculation that perhaps it never will? Will a different political party be occupying the White House and in charge of the House and Senate, implementing policies that are intended to further diminish oil and gas and increase renewables? Will we still be in an economic depression?

If the past is prologue, then it is hard to imagine that even all of the chaos of 2020 will somehow change, in any significant way, the longstanding reality that the U.S. and the world get 80% of their energy from fossil fuels (oil, natural gas, and coal). First, for the domestic and global economies to recover, they will certainly need every bit of that 80%. Second, no other energy source, or combination of energy sources, can even come close to replacing everything that fossil fuels provide.

Looking to the past for direction only makes sense, given that the past represents reality and can be analyzed as something that actually happened. However, as all of

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THOSE OPPOSED TO OIL AND GAS CONTINUE TO SEARCH FOR DIFFERENT WAYS TO ARGUE THEIR CASE, BUT THE UNAVOIDABLE ANSWER IS ALWAYS THE SAME — NO ENERGY SOURCE MAKES MORE ECONOMIC SENSE THAN OIL AND GAS

About the author: *Bill Keffer is a contributing columnist to SHALE Oil & Gas Business Magazine. He teaches at the Texas Tech University School of Law and continues to consult. He also served in the Texas Legislature from 2003 to 2007.*

us that consume information 24/7 know all too well, the media are replete with so-called pundits, telling us exactly what will happen tomorrow, next week and next year. As we also know all too well, the shelf life of any of their forecasts usually lasts no longer than until the next commercial break. Predicting crude oil prices a week from now is a lost cause, let alone stating with any authority what prices will be next year. There are trends, and there are reasonable assumptions—but then developments like pandemics, economic shutdowns, hurricanes, etc. show up on our doorstep unannounced.

Notwithstanding the ever-present unpredictability of life and the occasional trauma caused by these gut punches to the oil and gas market, the unrelenting and inarguable reality is that crude oil and natural gas continue to be the reigning economic preferences for our energy sources. In other words, when the decision is left to the marketplace, oil and gas continue to dominate in terms of abundance, affordability, and density (power bang for the buck). When consumers are allowed to make their energy decisions based on economic considerations, no other energy source comes close.

However, it is never a given that such decisions will be permitted to be made solely on economic grounds. Government, even in America, has been known to try to swim against the economic current, in order to accomplish a particular objective. Here, it is clear that certain elected officials and the constituencies they represent place a higher premium on addressing fears relating to climate change and other environmental issues and are, therefore, quite willing to mandate economically irrational practices, which would have the effect of diminishing oil and gas in the energy mix. Regardless of one's view on the desirability of one energy source over another, it should not be debatable that rejecting oil and gas makes no economic sense.

Of course, even under the force of government mandate, if something does not make economic sense, the marketplace will respond, one way or another. In other words, swimming against the economic current cannot last very long, before exhaustion takes over, and reality reappears. Nevertheless, during the interim of searching for a government-mandated utopia, significant damage can be done.

So, the real question is—will the current combination of factors (pandemic, excess supply, and reduced demand) create an opportunity for economically-irrational policies to be implemented that will significantly suppress and diminish the use of crude oil and natural gas in the overall economy? In fact, this is really the same question that is repeatedly posed in our national political debate. It just seems like a new, different, more urgent question now because of the unusual factors that have presented themselves in 2020. Those opposed to oil and gas continue to search for different ways to argue their case, but the unavoidable answer is always the same—no energy source makes more economic sense than oil and gas.

But, of course, the answer is even more than that. Not only are oil and gas more economical than any other energy source, but other energy sources cannot even do what oil and gas can do. No other energy source can provide the fuel required for planes, trains, ships, and long-haul trucks. No other energy source can provide the feedstock for fertilizers, plastics, and the endless list of manufactured products that we all use every day—and do not even realize it.

Is this the beginning of the end for oil and gas? We had better hope not.

Tom Wolf's Bullying of Natural Gas Harms All Pennsylvanians

By: **Tom Shepstone**

Pennsylvania Governor Tom Wolf, during his first term, put on as much of a happy face as the man could muster with respect to natural gas, knowing so much of the Keystone State economy depended on it. Reelection in 2018, though, freed Wolf to be the man he really is; the man who spoke at a Democracy Alliance #Resistance confab in California in 2017. Thinking it was all relatively secret, he talked about how to advance the policies of this outfit. Democracy Alliance had funded Citizen Action of New York, one of the key organizers of anti-fracking efforts in the Empire State, but Tom Wolf wanted in.

Yes, and now that Tom Wolf is free, he's committed Pennsylvania to follow New York's lead on several matters. These have included his decision, on his own, to put the Commonwealth into the Regional Greenhouse Gas Initiative (RGGI), of which the member states have accomplished only but half of what Pennsylvania has done in reducing carbon emissions. But, they have managed to raise their electricity prices in inverse proportion, which counts as an accomplishment in the green world of renewables rent-seeking schemes.

Consider, for example, a few basic facts. RGGI states (New York, New England and friends) reduced their CO2 emissions associated with electric power generation by 17% between 2010 and 2016. It sounds good until you realize the Keystone State reduced its CO2 emissions by 32%, thanks to the shale revolution and natural gas being substituted for coal in generating power.

Moreover, Pennsylvania was the largest net exporter of electricity in the United States from 2013-17, according to the U.S. Energy Information Administration. This means the Commonwealth has been supplying the lower CO2 power on which many of the RGGI states depend. It's also less expensive power. RGGI states produce power too, but Pennsylvania electricity rates are 51% lower. Yet, Tom Wolf wants his state to join the losing side.

Fortunately, he doesn't seem to be getting away with it, at least not yet. A bi-partisan group of Pennsylvania legislators has strongly opposed his attempt at green political correctness and the Pennsylvania House Environmental Resources and Energy has just reported out a bill that would prevent Tom Wolf from imposing carbon emissions taxes without their approval, which is what RGGI executive action is all about.

RGGI, though, is just the latest attempt by Tom Wolf to bully the natural gas industry with his never-ending burnishing of his green credentials. He's also attempted, so many times most of us have lost count, to enact what is in effect a second severance tax on natural gas production. He's changed the nature, the size and the beneficiaries of the tax repeatedly in futile efforts to impose such a tax, falsely claiming Pennsylvania is the only major gas-producing state without one.

But, of course, Pennsylvania does have a severance tax in the form of a Marcellus Shale Impact Fee that has raised hundreds of millions of dollars every year, and that is distributed primarily, but not exclusively, to areas of the Commonwealth that produce the gas. It funds all sorts of projects while helping to lower other taxes at the local level.

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This close relationship between impacts and benefits makes perfect sense to most, but urban constituencies important to Tom Wolf want

more money, and he wants more green street cred, so the interminable battle continues year after year. The COVID-19 impact on the state budget will undoubtedly be the next excuse employed by our governor, who seems to take petty resentment at not getting his way to the highest plane imaginable.

Perhaps it is because he isn't getting his way on RGGI and imposing another severance tax that Tom Wolf is punishing the industry in other ways. His Department of Environmental Protection (DEP) is in the process of raising its application fee to drill a new shale well. It is now

$5,000, about the same as the $5,500 permit application fee in neighboring Ohio, but Tom Wolf's administration wants to raise it by 150% to $12,500. Not a big deal, some would say, but it comes at a time when gas prices are lower than low, profits have disappeared and some companies are facing bankruptcy. DEP bizarrely complains that it needs the money because there is less activity, which tells us it's probably more about punishment than revenue — more of Tom Wolf's pettiness, in other words.

Then there is the continuing campaign by Wolf to impose new methane emissions rules even though those emissions are already being rapidly reduced by the private actions of shale companies who have every incentive to capture them, as their business, after all, is selling the stuff. As the Marcellus Shale Coalition notes, "The industry's focus on limiting emissions has helped lower combined methane emissions from oil and natural gas systems 23.2% since 1990 … [while] natural gas production has increased 50%."

That wasn't enough for Tom Wolf, though, and he proceeded in 2018 to enact over-the-top and completely unnecessary regulations on new shale gas wells that did little more than temporarily appease his green supporters and raise the cost of production. Now, because his green friends are unappeasable and want more, he's proposing additional methane emissions regulations on existing infrastructure and production.

These new regulations, according to the anti-gas site ShaleImpactPA (funded by the same folks funding the Delaware Riverkeeper and several other anti-gas groups), would:

"[R]equire better monitoring and control of emissions at existing oil and gas wells, including those that use hydraulic fracturing, and related sites. Companies would have to install equipment to stop emissions from escaping, and inspect sites for leaks every three months."

DEP claims the rule will eliminate 4,404 tons of VOCs and 75,603 tons of methane emissions at a cost of $35.3 million per year or $441 per ton. That cost, of course, will be passed on to natural gas companies and their consumers. Has anyone calculated the benefits versus the costs? Only if you accept the half-baked justification offered by DEP for their proposed new regulations, one based on a tangential relationship to ozone levels and accompanied by a disclaimer saying DEP is "not stating that these estimated monetized health benefits would all be the result of implementing the proposed … measures."

This is what Tom Wolf has wrought. He's no friend of natural gas and never has been. He wants the plaudits of radical enviros and the sort of elites he so enjoyed mingling with at the Democracy Alliance #Resistance get-together in 2017. He's now revealing who he really is, and he's not about Pennsylvania's welfare but, rather, Tom Wolf's image with the gentry class.

RGGI STATES REDUCED THEIR CO2 EMISSIONS ASSOCIATED WITH ELECTRIC POWER GENERATION BY 17% BETWEEN 2010 AND 2016 WHICH SOUNDS GOOD UNTIL YOU REALIZE THE KEYSTONE STATE REDUCED ITS CO2 EMISSIONS BY 32%, THANKS TO THE SHALE REVOLUTION AND NATURAL GAS BEING SUBSTITUTED FOR COAL IN GENERATING POWER

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Four Must-See Museums for Texas Oil History

By: **David Porter**

Oil and natural gas are arguably the most important product in the world. In 2019 there were 96 countries in the world producing oil and natural gas. World statistics in 2018 show that over 55% of world energy production comes from oil and natural gas. The world's economy would not function without oil and natural gas production. The oil business is not only important to the economy, but it is a huge part of Texas history.

If you're interested in Texas history or just want a fun and interesting trip, I would suggest visiting the following four museums to learn more about the oil industry.

My first suggestion would be the Permian Basin Petroleum Museum in Midland. I may be slightly prejudiced since I lived in Midland for 30 years and visited the Petroleum Museum numerous times. However, it's a great place full of interesting exhibits about the Permian Basin and the industry. The Permian Basin is the largest oil-producing area in the United States. The grounds of the museum host a large collection of drilling rigs and other oil field equipment. For those who are still skeptical that Midland would be a great vacation idea, may I remind you that Midland is a great jumping-off point for and is the closest commercial airport to Fort Davis, Alpine, Marfa and the Big Bend area.

My next suggestion is to visit the East Texas Oil Museum in Kilgore. This museum is a little lighter on exhibits detailing the technical parts of the oil industry and a little heavier on the local history than the Permian Basin Museum, but you will get both items at each museum. The East Texas oil field is the primary focus of the museum. That field was considered the largest field in the United States for many years, and it was a major contributor to the allied victory in World War II because of the tremendous amounts of oil produced from that field during the war. Downtown Kilgore has what was once known as the world's richest acre because of the proliferation of oil wells drilled there. Last time I was there, they also had a few good restaurants and interesting shops.

The next museum is the Ocean Star Museum in Galveston. This museum is different in a couple of ways. First, I have never personally been to this museum, but have heard good reports from a number of people who have. Most importantly, this museum is geared toward the offshore oil and gas industry instead of onshore production. This museum is inside a retired jack-up drilling rig. For secondary attractions, if you need to keep your kids or grandkids happy, Galveston has beaches, history and various tourist attractions.

When people think of oil in Texas, they often think of Spindletop. The Spindletop/Gladys City Boomtown Museum in Beaumont commemorates the first big discovery that made oil a major part of Texas lore — both fact and fiction. This museum emphasizes where it all started and is affiliated with Lamar University.

The four museums mentioned above are all primarily about oil. However, as huge a part of Texas life as oil is, many museums have important exhibits and major portions of the museum devoted to oil and natural gas history. Here are some that are worth visiting that are located in major Texas cities: Fort Worth Museum of Science and History, Wiess Energy Hall (Houston), Museum of Natural Science, Bob Bullock Texas State History Museum (Austin) and the Perot Museum of Nature and Science (Dallas). Learning about oil is not only educational and interesting, but also a good way to see some fascinating and historic parts of Texas.

THE OIL BUSINESS IS NOT ONLY IMPORTANT TO THE ECONOMY, BUT IT IS A HUGE PART OF THE HISTORY OF TEXAS

About the author: *David Porter has served as a Railroad Commissioner (2011–17) and Chairman (2015–16), as well as Vice Chairman of the Interstate Oil and Gas Compact Commission (2016). Prior to service on the Commission, Porter spent 30 years in Midland, Texas, as a CPA working with oil and gas producers, service companies and royalty owners. Since leaving the Commission, Porter works as a consultant for oil and gas companies. He also serves as Chairman of the 98th Meridian Foundation, a nonprofit concerned with water, energy and land issues.*


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Much is at Stake in the Upcoming National Elections

By: **Jack Belcher and Brent Greenfield**

We all know that a lot is at stake in this year's national elections. The U.S. presidency and Congress are up for grabs. Early polls suggest that President Trump is vulnerable in his race against Joe Biden to seek a second term. The slim Republican margin in the U.S. Senate is also at stake. It is still far too early to make any predictions, but the state of the economy, the pandemic and social unrest will all likely play a role in the election outcome.

As to the U.S. oil and gas industry, it is only July and the sector has already endured its most tumultuous year ever. Looking ahead, the outcome of the upcoming presidential and congressional races and the public policies to follow will have a profound impact on the industry's ability to recover and maintain its dominance as the world leader in both oil and natural gas.

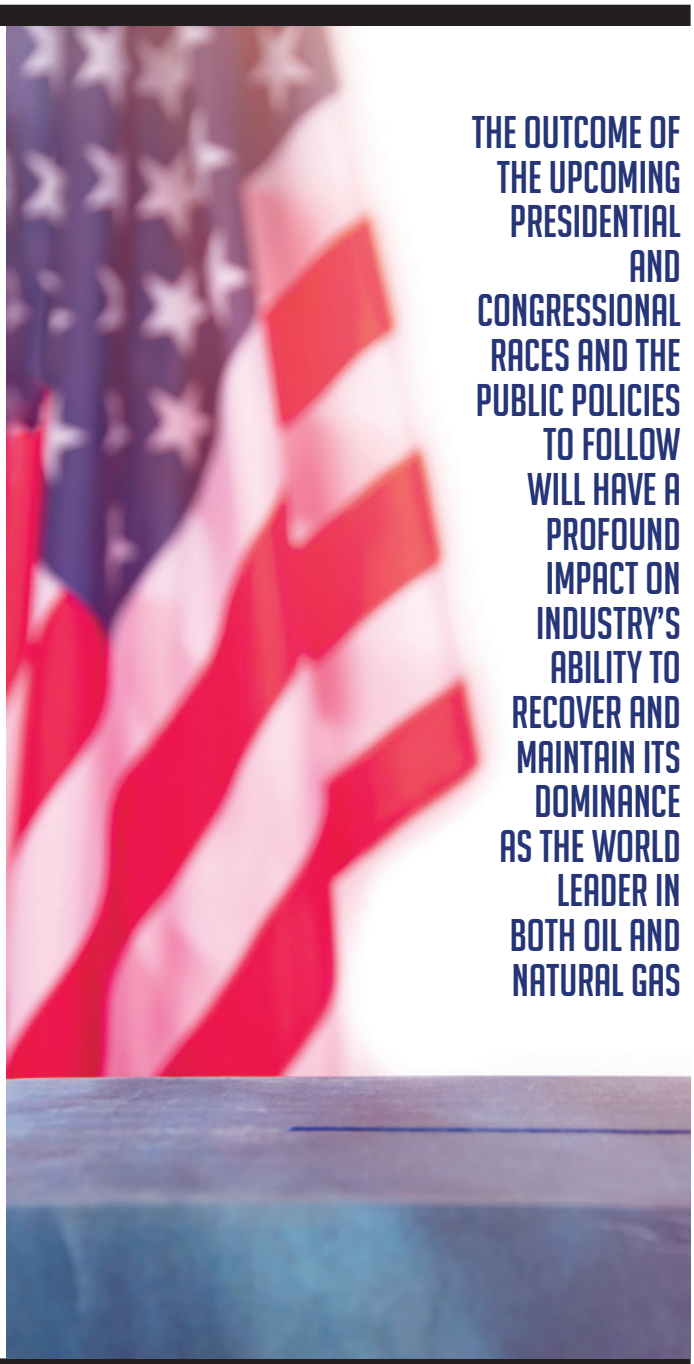
The Democratic presidential primary process that will lead to the official nomination of Joe Biden as the party's candidate this summer was mired in rhetoric and policy proposals that were extremely anti-fossil energy, including bans on federal oil and gas leasing, fossil energy exports and hydraulic fracturing, as well as a zero-emission energy target for 2035. For his part, Biden stated that we must be willing to sacrifice oil and gas jobs in order to transition to a green economy.

On one hand, presidential candidates tend to soften their positions on issues once they have achieved the nomination and begin to court more centrist voters. While that may well be the case again this year, there are clear indications that Biden's views on energy may remain hardened, as evidenced by his choice of Alexandria Ocasio-Cortez to co-chair his climate change task force. Let's explore some of the potential impacts if Biden does not moderate on energy and goes on to win in November.

First, no longer would industry be able to depend on presidential leadership to promote U.S. oil and gas production and exports. Instead, expect a Biden administration to flex its muscle and voice to reduce fossil energy production and to use and promote a climate change agenda.

Although Biden later reversed his stated promise to impose a ban on "new fracking," Biden would likely be surrounded by energy and environmental policy advisors who, for the most part, oppose hydraulic fracturing. If the Democrats were to take the U.S. Senate and hold on to the House, a Biden administration would also be likely to support the statutory exemption for the regulation of hydraulic fracturing under the Safe Drinking Water Act. Even without a Democratic majority to work within Congress, more stringent environmental regulations should be expected, many of which would likely be detrimental to shale operations and fossil energy more broadly.

Specific areas for more stringent regulation would likely address areas including water management and disposal standards, vehicle



THE OUTCOME OF THE UPCOMING PRESIDENTIAL AND CONGRESSIONAL RACES AND THE PUBLIC POLICIES TO FOLLOW WILL HAVE A PROFOUND IMPACT ON INDUSTRY'S ABILITY TO RECOVER AND MAINTAIN ITS DOMINANCE AS THE WORLD LEADER IN BOTH OIL AND NATURAL GAS

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fuel economy standards, and flaring and methane emissions, the latter of which is receiving greater attention amid recent efforts by the Environmental Defense Fund to quantify methane emissions in the Permian Basin and identify associated operators.

In addition to stronger regulations, access to future oil and gas resources would likely be severely hampered under a Biden administration. He has already committed to "banning new oil and gas permitting on public lands and waters," and vowed to increase renewable energy production on federal lands and offshore. Beyond outright banning access through leasing moratoriums, additional actions that would be expected include more stringent application of the National Environmental Policy ACT (NEPA) processes and the Marine Mammal Protection Act, application of the Endangered Species act to both federal and non-federal activities, stricter restrictions on offshore drilling, expansion of marine protected areas, and a more top-down, protection-focused ocean policy.

Looking beyond the upstream sector, there would be increased obstacles to federal permitting of oil and gas pipelines and other energy infrastructure under a Biden administration. He has voiced his opposition to both the Keystone XL and Dakota Access pipelines. Under a Biden administration, federal policies would generally oppose the construction of new oil and gas pipelines and other infrastructure, such as LNG export facilities that support fossil energy production and transportation. A Biden administration could also significantly change the criteria by which the Federal Energy Regulation Commission (FERC) approves or disapproves pipeline projects, basing its decisions less on economic and societal impacts and more on climate-related considerations. These changes would result in increased costs and delays for pipeline and LNG projects.

More broadly, U.S. policy on climate would be starkly different under a Biden administration, with an activist U.S. position toward decarbonizing the economy. We would expect an early move toward the adoption of the Paris Climate Agreement from which the Trump administration has taken steps to withdraw. He would likely embark on programs to support Green New Deal concepts such as net-zero carbon by 2050 and subsidies for green energy technologies and infrastructure. Should Democrats control the Senate, expect legislative efforts to implement a carbon pricing mechanism through some combination of a carbon tax and cap and trade program, as well as efforts to change the tax code to increase the cost of fossil energy production and distribution and incentivize renewable energy production, development, and infrastructure.

A Biden administration would similarly be expected to support ongoing efforts by investors and financial institutions to more broadly push for the adoption of environment, social and governance (ESG) principles and standards by corporations and institutions. There are also reasons to believe that it would push the Securities and Exchange Commission to initiate regulations that would attempt to standardize ESG metrics and reporting requirements or even seek to require that publicly-traded companies, including those in the oil and gas industry, publish ESG metrics. Under a Democratically-controlled Congress, there may even be legislation adopted that would require public companies to adopt ESG programs and report ESG metrics.

It is also expected that a Biden administration would be supportive of overall global efforts to discourage investment in or financial support for fossil energy entities and projects. Congress and the administration might impose stricter rules, new disclosures, and stress tests on financial institutions regarding climate-related oil and gas activities. The U.S. government might also join NGOs and other organizations that pressure development banks and large commercial institutions not to support fossil energy projects.

In terms of foreign policy, a Biden administration would likely support the Iran Nuclear Deal and lifting sanctions on Iranian crude oil. It would likely be less supportive of Saudi Arabia's position in the region, and less prone to actively oppose Russia's attempts to provide more natural gas to Europe through the Nord Stream II pipeline project.

As for China, a Biden administration would be almost certain to embark on a path of improved relations and relaxation of tariffs, a move that would likely provide relief to the U.S. upstream, midstream, and downstream sectors and remove a cloud that has been hanging over U.S. LNG, crude oil, refined product, and chemical exporters.

While it is far too early to know who will win the White House and who will control Congress, it is clear that the upcoming elections will have a major impact on the future of the oil and gas industry. To the relief, or at least hope, of some in the industry, Biden would not likely be as fervently anti-fossil energy as his rhetoric on the campaign trail might suggest. However, with the power to issue executive orders and shape policies that would affect an oil and gas industry already damaged by a collapse in prices and global demand, should Biden be elected — and especially should his party win control of both houses of Congress — he should be expected to use it.

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About the author: *Jack Belcher joins Cornerstone in 2019 with over 25 years of experience in energy and energy policy. As senior vice president of Cornerstone Energy Solutions, he provides strategic and tactical advice to energy and transportation companies and financial institutions, focusing on government relations, regulatory affairs, public policy, strategical communications, situational risk management, and Environmental, Social, and Governance (ESG) performance. Jack also serves as managing director of the National Ocean Policy Coalition.*

Navigating Sexual Orientation or Gender Identity Discrimination in the Oilfield

By: Annette A. Idalski and Pooneh Momeni

The U.S. Supreme Court ruled on June 15, 2020, that Title VII of the Civil Rights Act of 1964 prohibits employment discrimination based on sexual orientation or gender identity. This momentous, 6-3 decision came in Bostock v. Clayton County, in which the plaintiff claimed he was fired because he is gay.

Energy companies already have been a favorite target of plaintiffs' lawyers looking for violations of overtime laws and those same lawyers now have another arrow in their quiver to pursue employment claims against the industry. With layoffs continuing to be high in the oil fields, workers and their attorneys can be expected to look for other means of recourse. This is particularly a concern in the shale industry where it is estimated a third of the jobs will disappear in 2020.

The *Bostock* Decision

The opinion resolved three related cases: Bostock v. Clayton County, Zarda v. Altitude Express, Inc., and EEOC v. R.G. &. G.R. Harris Funeral Homes, Inc. Two of the cases concerned discrimination based on sexual orientation and one dealt with discrimination against a transgendered woman. In all three cases, the employee was fired shortly after revealing he or she was gay or transgender, according to the decision.

Each of the plaintiffs challenged their termination as a violation of Title VII, which makes it unlawful for an employer to make employment decisions (such as hiring, firing, promoting, or transferring) because of the individual's race, color, religion, sex or national origin. Interpreting the statute's reference to "sex," the Supreme Court held, "[a]n employer who fires an individual for being homosexual or transgender fires that person for traits or actions it would not have questioned in members of a different sex. Sex plays a necessary and undisguisable role in the decision, exactly what Title VII forbids." In other words, "it is impossible to discriminate against a person for being homosexual or transgender without discriminating against that individual based on sex."

The court also made it clear it does not matter if the employer relied on other factors besides the employee's sex. "If the employer intentionally relies in part on an individual employee's sex when deciding to discharge the employee—put differently, if changing the employee's sex would have yielded a different choice by the employer—a statutory violation has occurred," according to the decision written by Justice Neil Gorsuch.

Practical Effect

One of the most serious threats to the financial health and well-being of an organization today is the damage caused by discrimination, harassment and retaliation in the workplace. In 2019, the Equal Employment Opportunity Commission received 23,532 complaints of sex-based discrimination. The EEOC complaints resulted in $170.7 million of settlements, and that does not include damages obtained through private litigation.

The Bostock decision expands Title VII's protections to all LGBTQ employees working for private companies with 15 or more employees. Although many states and corporations already have anti-discrimination policies protecting sexual orientation and gender identity, the majority of states, including Texas, have no such protections. For companies based in these states, the Bostock decision will have immediate effects.

Employers should review their employment policies, handbooks and training materials to ensure they comply with the Supreme Court's decision. Specifically, companies should ensure sexual orientation and transgender status are included as protected characteristics or added to the definition of "sex." Although the boilerplate nondiscrimination statement that many companies use stating "the company does not discriminate in employment practices or opportunities on the basis of race, color, religion, sex and national origin" now implicitly includes sexual orientation, businesses may want to con-

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BY UPDATING POLICIES AND TRAINING EMPLOYEES TO PROVIDE AN INCLUSIVE WORKPLACE, EMPLOYERS CAN PROACTIVELY REDUCE THEIR RISK OF FUTURE CLAIMS

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sider a revision to specifically include sexual orientation and gender identity. In the event sexual orientation and gender identity are excluded under an employer's policies, those policies should be updated immediately.

Additionally, employers should review all policies with an eye toward LGBTQ issues and preventing LGBTQ discrimination in the workplace. For example, companies may adopt gender-neutral restrooms or revise policies regarding gender-specific restrooms to allow transgendered and transitioning employees to use the restroom of the gender with which they identify. Companies should adopt dress code policies that allow transgendered and transitioning employees to dress according to the gender they identify with. Similarly, companies should ensure health care and other benefits, such as parental leave, provide equal access to transgender and homosexual employees. Oil and gas companies that hire employees to work in the oilfield, on pipelines and offshore, must make accommodations for employee living quarters to the extent gender identity issues among their workforce exist. At the same time, care should be taken to ensure employees' privacy.

Training is the key to avoiding LGBTQ discrimination claims, and that is particularly true in the oil fields where the culture is less buttoned down and corporate. As with all discrimination claims, documentation of performance issues is vital, and managers must avoid any behavior or conversations that suggest bias. Since many field managers and employees may not be familiar with LGBTQ issues, we recommend that training include tangible examples of job-related discrimination.

Conclusion

The Bostock decision inevitably will lead to an increase in litigation alleging LGBTQ discrimination. By updating policies and training employees to provide an inclusive workplace, employers can proactively reduce their risk of future claims.

COVID-19, Energy and the Economy

By: Thomas **Tunstall**

This past April, just ahead of futures contract expirations, the price of West Texas Intermediate (WTI) crude oil did something it's never done—it went negative, all the way down to minus $37.63 per barrel. In short, U.S. exploration and production companies overwhelmed storage facilities, which essentially reached capacity.

At the risk of invoking cliché, it was the perfect storm. COVID-19 stay-at-home precautions severely curtailed economic activity and crude oil consumption. Daily automobile commutes and air travel plunged due to telecommuting and cancelled or postponed events, conferences and vacations. The result was falling global oil demand by as much as 20 million barrels per day, representing a 20% drop in worldwide usage. Meanwhile, rising global oil production by OPEC countries, Russia and the U.S. glutted markets. Even now, the world remains awash in crude oil, with little relief in sight.

The ripple effect will continue to be felt all along the energy industry supply chain, with significant impacts to Texas. Manufacturers that supply the oil and gas industry will suffer, as will retail and service businesses deriving income from oilfield workers and support staff personnel. Renewable energy sources will struggle to compete with record low oil and gas prices.

Exploration and production company bankruptcies will skyrocket, particularly by smaller, independent producers with limited capital reserves. In the meantime, better-capitalized firms will pick up assets on the cheap, hunker down and wait for better days.

Prior to COVID-19 restrictions, Texas Comptroller Glenn Hegar expected to see an increase in the Economic Stabilization (or Rainy Day) Fund. With the collapse of oil prices, a shortfall seems certain, potentially reaching $3 billion for the year. This will pose significant funding challenges for public and higher education, as well as transportation budgets in the upcoming legislative session next year.

Prospective remedies appear limited. The Trump administration may yet consider tariffs on oil imported to the U.S., a move not likely to find favor with refiners who import heavier crudes from OPEC. Topping off the Strategic Petroleum Reserve with 75 million barrels—around a day's level of current global consumption—will do little to assuage the situation.

In Texas, the Railroad Commission faced something of a quandary as it grappled with the question of proration. The last time limits were placed on oil production in Texas was in 1973, so those with any implementation experience are few and far between. While the commission considered imposing proration in April, happily oil prices have since stabilized somewhat.

Regulating the production of crude oil, or proration as it is known, has always been controversial. In the 1930s, East Texas produced so much oil that prices fell to ten cents per barrel. The governor, state legislature, federal government and the courts all tussled with the issue, going back and forth trying to stabilize prices. Ultimately, growing market demand probably did more to resolve the situation than anything else—as will likely be the case this time around as well.

Despite the relative turmoil in energy markets, it's not the end of the world—futures markets for crude prices later this year remain near $40 per barrel. Increased economic activity will revive demand, though substantive recovery still looks to be a ways off. In the meantime, long-term behavior has almost certainly been altered as a result of COVID-19. Increased reliance on home delivery of all manner of products will give a boost to providers of such services. Automation of processes and transactions previously requiring people will become more common. Sporting events, movie theaters and festivals may see a falloff in attendance for years to come. Most importantly, sanitization in all forms will become a bigger part of our reality.

As has been the case during periodic epochs of human history, the world once again undertakes a massive, uncontrolled natural experiment. How events play out going forward is anyone's guess, no doubt with more surprises still yet to come.

About the author: *Thomas Tunstall, Ph.D. is the senior research director at the Institute for Economic Development at the University of Texas at San Antonio. He is the principal investigator for numerous economic and community development studies and has published extensively. Dr. Tunstall recently completed a novel entitled "The Entropy Model."*

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Managing Safety Amid New Challenges

By: **Nick Vaccaro**

The year 2020 has plagued the oil and gas industry with challenges. The onset of COVID-19, coupled with the record free fall of prices, left oil and gas personnel frantically searching for answers while recovering from this shocking new life. Although historical, this reality's effects are nothing new to the world of HSE, a term representing health, safety, and environmental components of the industry.

HSE departments throughout the energy sector recognize the profession's cyclical nature. With every change encountered, ranging from an economic downturn to global disruption, HSE departments find themselves on the front lines of budget cutbacks and reduction in force. The question of why is continually pondered, yet easily answered.

No income is generated by HSE departments. In the world of economic and health uncertainty, the bottom line is even more precarious than ever. A certain survival instinct prevails, and meeting the everyday demand takes the front seat. Safety is not bypassed with dangerous behavior dominating, but the dollar earned overshadows the dollar saved. It mirrors a young family struggling to financially survive while postponing saving for the future.

HSE departments respond in a variety of ways while the proverbial savings account is temporarily abandoned. While the effects are similar, both E&P companies and energy service companies have similarly responded to challenges.

Craig DeVillier, SSU Technician with Equinor's Bakken Formation office, identifies the most significant change to Equinor's HSE department as a reduction in force. Areas of coverage were previously divided up among team members. Responding to budget cutbacks, Equinor still divides those areas up, but with less personnel covering the territory.

"It makes for a lot more windshield time," said DeVillier. He noted that adapting to that decrease has prompted creative thinking. Although budgets have been slashed, the demand is still ever-present. As a result, a more streamlined focus was developed to meet HSE needs. "Now, we collaborate in the mornings to identify high-risk activities for the day," he said. "If we have a critical lift or an energy isolation, we make sure we go see that when it is scheduled."

DeVillier said Equinor's new methods of ensuring workplace safety have not been compromising. In fact, he identified a positive outcome while still acknowledging his concern and regret for those who have encountered job loss. "It has forced everyone to take responsibility for their own safety and the safety of others on location," he said.

Oil and gas service companies have not declared immunity to new ways of monitoring and maintaining safety. According to James Wallington, HSE Technician with Total Safety's Permian and Delaware Basin Departments, the world energy market's upset had a two-fold effect on his employer. "Not only did we see a reduction in force," said Wallington, "but a lot of people who were able to keep their jobs saw decreased wages and a decrease in available hours."

Wallington said it was a jolt when industry leaders began stacking rigs after determining drilling operations were no longer feasible. Combatting maneuvers for this economic attack came in the form of creativity. "With the close of one service came another," said Wallington, noting that Total Safety retained a percentage of their personnel by offering new services. With COVID-19 wreaking havoc, they responded by training personnel and offering screening services. Like a modern-day Industrial Revolution, Total Safety implemented the screening service within the oilfield industry, and countrywide as well.

Being a veteran oilfield employee, Wallington stated downturns in the oil and gas industry are frequent, should be expected, and occur due to a variety of reasons. "We should be looking to the future because something like this will happen again," said Wallington. "We should be preparing for the future to secure jobs and reserve funds." Wallington suggested employee savings programs and the banking of hours. This could serve as supplemental or reserve funds to maintain long-term employment.

Although the world energy market is complex, oilfield businesses continue to prove during every slump they possess creative minds and innovative spirits to discover new and effective methods to succeed. As those forward thinkers continue to persevere and conduct business, HSE will be tasked with matching that ability to adapt and guarantee workplace safety.

OILFIELD BUSINESSES CONTINUE TO PROVE DURING EVERY SLUMP THEY POSSESS CREATIVE MINDS AND INNOVATIVE SPIRITS TO DISCOVER NEW AND EFFECTIVE METHODS TO SUCCEED

About the author: Nick Vaccaro is a freelance writer and photographer. In addition to providing technical writing services, he is an HSE consultant in the oil and gas industry with eight years of experience. He also contributes to Louisiana Sportsman Magazine and follows and photographs American Kennel Club field and herding trials. Nick has a BA in Photojournalism from Loyola University and resides in the New Orleans area. 210-240-7188 ***Nick@shalemag.com****.*

The Future of Natural Gas

EXCERPTS FROM "THE FUTURE OF BUILDINGS, TRANSPORTATION AND POWER"

By: **Roger Duncan and Michael E. Webber**

In the first two decades of the 21st century, natural gas has been the primary winner in the electric generation industry. Gas should continue its success in the near-term, both in meeting new generation demands, and as supporting power for wind and solar as they expand. Modern, combined cycle, natural gas power plants are capable of operating at almost twice the energy efficiency of coal power plants. And since most of the potential pollutants in natural gas, such as sulfur dioxide, are removed prior to combustion, the emission streams from the plants are much cleaner than coal. This combination of higher efficiency, lower emissions, and now lower fuel price, have made natural gas power plants dominant in the power sector.

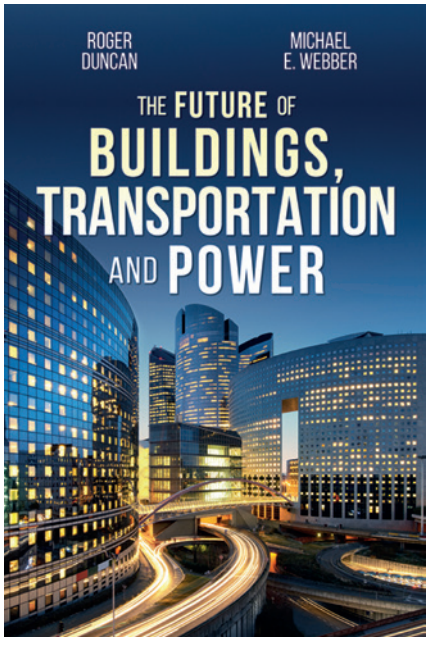
Natural gas is also gaining market share of distributed generation through fuel cells and conventional natural gas fired combined heat and power. Gas microturbines represent another aspect of natural gas penetration into the distributed generation market. For years, the price of natural gas was a deterrent to the expansion of these small turbines in the marketplace. With the onset of low natural gas prices in the 2010s, the use of microturbines is expected to expand, but still remain a distant second to solar.

Compared with petroleum, natural gas also has some benefits as a transportation fuel. It can be cheaper, the U.S. has vast stores of it, and its emissions of CO2 are lower than gasoline or diesel. The delivery service UPS added more than 700 compressed natural gas (CNG) vehicles to their fleet as part of their long-term goal of reducing their CO2 emissions.

Public transportation is another sector turning to natural gas as it decarbonizes. As of 2019, 29% of buses in the U.S. were fueled by CNG. While this might be a cost-effective and relatively simple transition for vehicle fleets with centralized fueling locations, it doesn't seem likely that we'll see large numbers of personal vehicles switching to the lower carbon fuel, especially given the increasing availability of electric vehicles. Honda had a Civic that ran on CNG, and Ford made a CNG version of their F-150, but neither model has been in production for the last few years.

And there is a fueling infrastructure problem. Even though natural gas vehicles have been around for decades, and many homes have natural gas plumbing, the fueling stations still number less than a thousand.

Gas is abundant, relatively clean at the point of combustion, and relatively inexpensive. Most experts agree that there is an enormous amount of gas in the U.S. alone. The reserves are estimated to be massive



(continued on page 61)

About the Authors:

Roger Duncan is a former Research Fellow at the Energy Institute at the University of Texas at Austin. He is the former General Manager of Austin Energy, the municipal elec-tric utility for Austin, Texas. Prior to that, he served as executive manager for several City of Austin departments, including the Environmental and Conservation Services de-partment and Planning and Transportation. Roger was also elected to two terms as Aus-tin City Council member in the early 1980's. In 2005, Business Week magazine recog-nized Roger as one of the 20 leading "carbon reducers" in the world, and in 2009 National Geographic recognized him as an international thought leader in energy efficiency.

Dr. Michael E. Webber serves as the Chief Science and Technology Officer at ENGIE, a global energy & infrastructure services company in Paris, France. Webber is also the Josey Centennial Professor in Energy Resources at the University of Texas at Austin. Webber's expertise spans research and education at the convergence of engineering, policy, and commercialization on topics related to innovation, energy, and the environ-ment. His latest book, Power Trip: the Story of Energy, was published in 2019 by Basic Books with a 6-part companion series on PBS. His first book, Thirst for Power: Ener-gy, Water and Human Survival, which addresses the connection between Earth's most valuable resources and offers a hopeful approach toward a sustainable future, was pub-lished in 2016 by Yale Press and was converted into a documentary.

enough to last many decades, if not centuries. And new hydraulic fracturing technology makes it relatively cheap to extract gas compared to getting to hard-to-reach conventional fossil fuel resources (such as offshore or remote fields). Because of these factors, U.S. gas production has grown significantly, starting in 2008. From 2007 to 2018, annual shale gas production in the U.S. grew from 1.3 trillion cubic feet to more than 17 trillion, and the EIA baseline forecast projects it to reach 33 trillion by 2050. Because of this abundance and ease of production, natural gas prices have fallen steeply. But, following an increase in drilling and expansion into more difficult to reach reserves, recent estimates from the EIA have the natural gas price slowly increasing up to 2050.

Though not expected to grow as fast as in the U.S., worldwide gas-fired electricity generation is also expected to grow by more than 50% from 2010 to 2040. Whatever the demand for gas around the world, there are several significant reasons why gas production in other parts of the globe will lag behind that in the United States. For one, the geology of most of the rest of the world is simply not as well-known and mapped as it is in the U.S. Some early hopeful prospects for large deposits, for example in Poland, haven't panned out for a variety of technical, political, and cultural reasons. Much of the relatively new, highly specialized drilling equipment needed to get to the gas reserves is still tied up in the U.S. And, with their larger reserves of other fuels and other energy agendas, many foreign governments are unlikely to make natural gas production a high priority.

That said, China, Mozambique, and the Middle East all have huge gas reserves that could be tapped when the time comes. And under the sea, and beneath some permafrost, gas methane from hydrate sources could represent enormous reserves if the technology could be perfected to safely use it. At present, the Japanese are leading the search for just such a technology.

The Future of Buildings, Transportation and Power by international thought leaders in energy Roger Duncan and Michael E. Webber, a unique, researched vision for our future, will be available fall 2020

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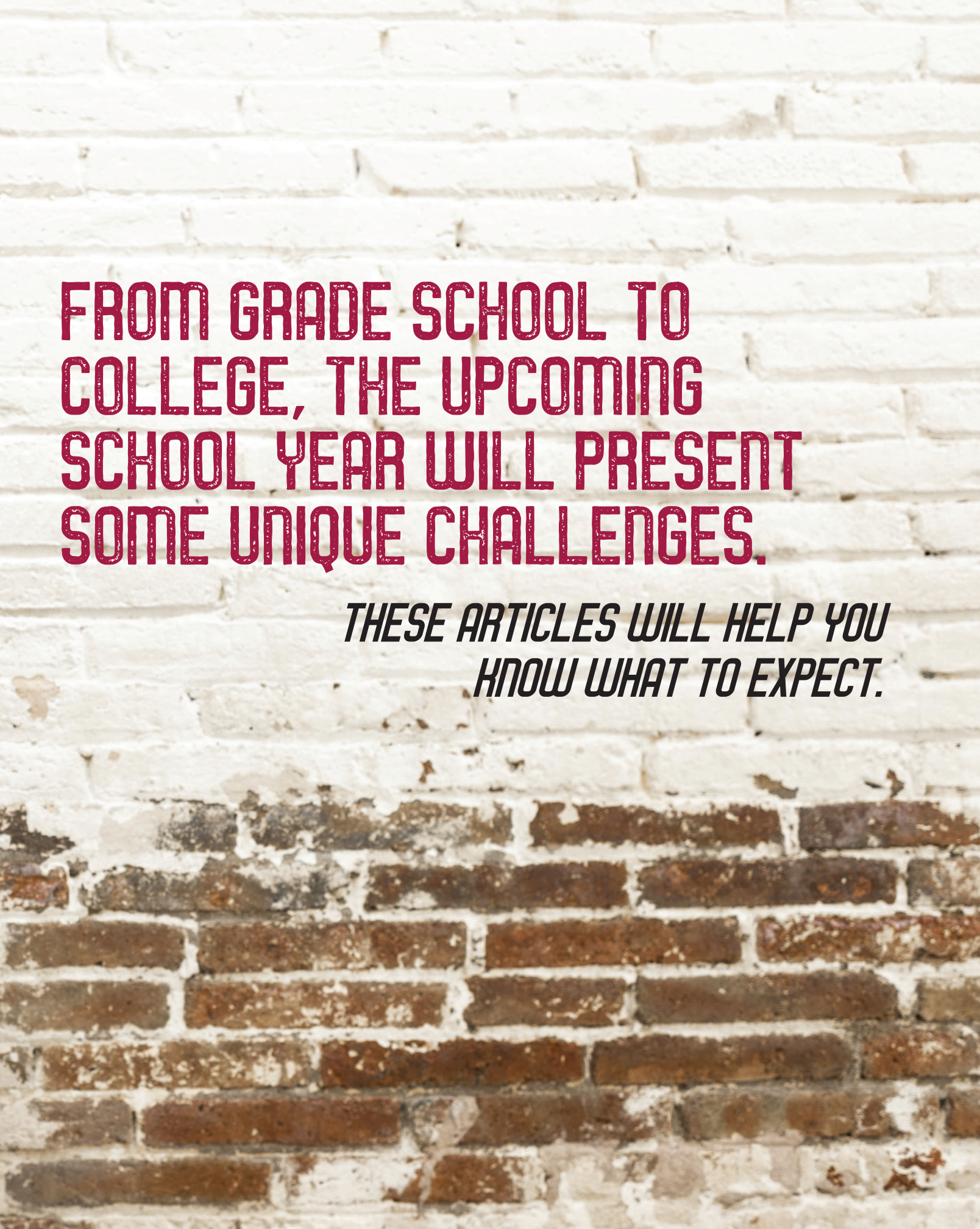
FROM GRADE SCHOOL TO COLLEGE, THE UPCOMING SCHOOL YEAR WILL PRESENT SOME UNIQUE CHALLENGES.
THESE ARTICLES WILL HELP YOU KNOW WHAT TO EXPECT.

SENDING YOUR CHILD BACK TO SCHOOL AMID COVID AND CHAOS

By: **Carole Lieberman, M.D., M.P.H.**

It's natural for parents and kids to feel a little apprehension as the first day of the new year of school approaches. In past years, there may have been butterflies in the stomach about making friends, getting good grades, being popular, maybe even worries about school shooters or the dreadful drills. But, this year, there is even more to be apprehensive about. As parents drop off their kids, they may be wondering if they're doing the right thing or if they're putting their kids in danger during this time of COVID and chaos. Let's look at some of the things parents can expect and pitfalls to avoid.

First of all, when parents drop their kids off at school, they can expect them to have more separation anxiety than ever, because kids have been used to being at home in lockdown, feeling protected by their parents, and the world they're now venturing into on their own has become scarier. Unless parents have been explaining the news to them and answering their questions about COVID, the murder of George Floyd, protests, riots, looting, toppling of statues and so on, kids will be very confused and frightened about all that has gone on since they were made to leave school many months ago. They are likely to bombard their teachers with these questions, some of which parents may prefer to answer according to their own values.

Different schools may follow slightly different rules when it comes to what safety measures they adopt. Students' reentry into socialization, after months apart, will be awkward. So, if they're also made to wear masks and stay six feet apart, it will make their reentry even more challenging. Since it's hard to tell what a person is feeling when they have a mask on, there won't be social cues to help kids know whether other kids are reacting to them favorably or not. Yet, since many children will have underlying fears of catching COVID, they may appreciate these precautions.

Students' reentry into their schoolwork is another challenge. Many will feel disoriented and disconnected from reading, writing and arithmetic—no less science, history and more difficult subjects. Some kids will have had very little instruction because 'distance-learning' was not very successful for the most part. Some kids didn't even have computers or had problems joining Zoom. Other kids were bored watching a teacher on the computer instead of in person. Many students had problems knowing what their assignments were and turning them in. So, most kids will feel lost and left behind if the teacher assumes the student has learned all the material from the previous year. Though schools and parents are eager to push students ahead, it would be best if parents kept their kids back a year—and even better if whole schools made the decision to have every child repeat the year to make sure that they have mastered the material.

These troubling times are affecting us all, so we need to look out for each other's mental health and get help when needed. For example, kids who have spent their time in lockdown playing countless hours of violent video games will likely have become more aggressive and may have problems controlling themselves towards their classmates. Teachers should also be sensitive to signs that a student is depressed, is failing or has other signs of psychological problems—and should bring this to the attention of parents and school counselors. Meanwhile, we can all agree that there should no longer be school shooter drills because they were traumatizing enough—before the events of 2020—and would be even more traumatizing now.

AS PARENTS DROP OFF THEIR KIDS, THEY MAY BE WONDERING IF THEY'RE DOING THE RIGHT THING OR IF THEY'RE PUTTING THEIR KIDS IN DANGER DURING THIS TIME OF COVID AND CHAOS

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About the author: Carole Lieberman, M.D., M.P.H. is a well known board-certified Beverly Hills psychiatrist, parenting expert, and author — notably the award-winning "Lions and Tigers and Terrorists, Oh My! How to Protect Your Child in a Time of Terror." She was trained at NYU-Bellevue and at Anna Freud's London Clinic and served on the Clinical Faculty of UCLA's Neuropsychiatric Institute. Dr. Carole testifies at trials as a forensic psychiatrist/expert witness and is a three-time, Emmy-honored TV personality who has appeared on Oprah, the Today Show, Good Morning America, CNN, Fox News, HLN, ET, ABC, CBS, NBC and many more. www.drcarole.com, www.terroristtherapist.com, www.expertwitnessforensicpsychiatrist.com

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UT PERMIAN BASIN:
RESILIENCY AND AN INNOVATIVE SPIRIT

By: **Alexa Dunson, UT Permian Basin Communications Manager**

We're only halfway through the year, but 2020 can be summed up simply: the year of uncertainty. It's hard to believe that just three months ago most of us were busy binge-watching Tiger King and had probably never heard of coronavirus. Now we can't turn on the TV or surf the internet without seeing the latest spike in COVID-19 numbers, head into the grocery store without wearing a mask or even find toilet paper.

Most of us are searching for one thing: predictability. That's exactly what universities are trying to provide as we approach the August start date, but it's no easy task.

Like most other schools, The University of Texas Permian Basin (UTPB) is trying to craft policies that minimize the risk of coming back to campus while providing that traditional collegiate experience. College campuses have many things to consider when it comes to navigating the unprecedented reality that comes with a global pandemic. The list includes everything from class sizes, housing arrangements, food service, athletics, on-campus events, faculty and staff safety, and so much more.

"During this uncertainty, our University has learned so much about our capabilities, and we've made adjustments along the way. The tools and innovations we have put in place have really prepared us for what lies ahead," said UT Permian Basin President, Dr. Sandra Woodley.

When students left campus for spring break in March, we had no idea they wouldn't return for the spring semester. You can imagine the questions that rolled in. To be honest, we didn't have all the answers. But we did know one thing: the health of our students, faculty and staff comes first. We put a plan in motion and finished strong, offering all instruction completely on-line. UTPB never missed a beat!

So what does Fall 2020 look like for the University? When students, faculty and staff walk back on campus they'll be required to wear masks. New signage will encourage social distancing. For those living on campus, housing staff will assign roommates by using the "pod" method, meaning roommates are assigned based on similar academic disciplines or athletic teams. Should a student become sick, isolation rooms will be in place to slow a potential spread.

A majority of our classes will be conducted in a hybrid format. For example, if a student has a Monday/Wednesday class, he or she will attend class in person one day and online the other day. This will cut back on class sizes significantly. For the courses that must be held in person, like clinicals or labs, social distancing will be enforced. Extra cleaning precautions will be visible across the campus.

As for dining services, take-out will be available and self-serve options will be removed. On-campus events will be permitted

LIKE MOST OTHER SCHOOLS, THE UNIVERSITY OF TEXAS PERMIAN BASIN (UTPB) IS TRYING TO CRAFT POLICIES THAT MINIMIZE THE RISK OF COMING BACK TO CAMPUS WHILE PROVIDING THAT TRADITIONAL COLLEGIATE EXPERIENCE

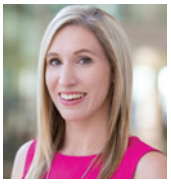
with attendee limitations and all students will have to register for events so the University can conduct contract tracing if necessary.

"UT Permian Basin is truly made up of an amazing community. Resiliency and an innovative spirit are part of what makes being a Falcon so special," President Woodley added. "We are ready to welcome students to our campus, but we will also be diligent about adhering to safety protocols."

Although the semester ahead will look different, our commitment to providing a quality education remains the same. We know that having an on-campus collegiate experience is important even as we carefully navigate the ever-changing COVID-19 pandemic. We look forward to welcoming our students back on campus this fall. After all, there's not much better than a campus full of students beaming with University pride.

ABOUT THE UNIVERSITY OF TEXAS PERMIAN BASIN:

The University of Texas Permian Basin is part of the world-renowned University of Texas System. Our University is changing, growing and most importantly—providing a quality education at an affordable cost. UTPB is the perfect size—small enough to offer personal interaction with professors and leadership opportunities across campus, while big enough to deliver a quality education and professional opportunities after graduation.



About the author: *Alexa Dunson is the Communications Manager for The University of Texas Permian Basin.*

START STRONG 2020:

BACK TO SCHOOL HEALTH AND SAFETY PROTOCOLS AT IDEA PUBLIC SCHOOLS

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The safety, health and well-being of every IDEA scholar is always our top priority. As we gear up for another great year of learning, in light of COVID-19, IDEA has developed a robust assortment of new safety and health protocols to ensure all students and families feel confident returning to their respective campuses.

To ensure IDEA is prepared to meet the highest safety standards and meet the expectations of families, IDEA consulted with local state and county health officials in addition to conducting several surveys to aid in the planning and implementation of procedures for the new school year.

Based on over 400 focus-group participants, over 4000 bilingual-survey respondents and leading research from the CDC and state health departments, IDEA has established protocols that all teachers, staff, students and parents will be required to adopt to ensure IDEA is prepared to meet the highest safety standards to help safeguard students and staff from COVID-19.

The results are an approach that encompasses personal protective equipment, updated school procedures and protocols, and safety upgrades to campus buildings.

Beginning in August, the following practices will be put into action and deployed on each IDEA campus:

Students who physically come to school will…

- Be provided with two reusable cloth masks
- Will wear masks when in public spaces (like hallways)
- Will stay in the same group & classroom throughout the day
- Eat all meals inside the classroom
- Receive physical education modified for social distancing
- Learn at desks equipped with Plexiglass desk guards and positioned six feet apart from each other

Teachers will…

- Rotate from classroom to classroom in upper-grade levels (excluding pre-K to 2nd grade)
- Ensure active-learning and handwashing breaks occur throughout the day
- Wear masks when delivering 1:1 instruction but will be able to remove them during whole-class instruction

IDEA has invested in equipment designed to protect students and staff from exposure to infection or illness. Hand hygiene stations will be located at each point of entry and in every classroom. Floor decals and signs will emphasize safety requirements, and restroom fixtures will be retrofitted with auto-flush kits. New campus entryways will also be established to avoid crowding and expedite campus pick-up and drop-off procedures.

IDEA will also update school arrival, dismissal, and transportation procedures. Arrival and dismissal windows will be extended, with staggered arrival and dismissal times for families. Upon arrival, all staff and students will undergo health screenings—including temperature checks with no-contact thermometers—and visit hand-hygiene stations.

"Our dedicated team is working around the clock to make the transition for students, staff and families as smooth as possible. Every protocol, practice and procedure has been evaluated and adjusted as needed to ensure a safe and strong return to classrooms this fall," says Layne Fisher, IDEA's Vice President of Auxiliary Services.

IDEA also announced a plan to ensure each scholar receives access to learning by equipping them with a laptop, computer or tablet for the 2020-2021 school year, at no cost to families. Dubbed IDEA's 1:1 Program, the program will facilitate direct access to teachers and classwork and keep all scholars on track regardless of where the learning itself is taking place

As schools embark on a new school year, it is more important than ever for families and campuses to improve cooperation and communication. By practicing safety measures at home, speaking to children about what to expect during the school year and why, and exercising patience as schools adjust to new schedules and procedures, together we can all make this school year a great success.

This year may present some unique challenges—our end-goal will always be the same: healthy bodies, healthy minds and happy students.

For more information on IDEA's safety measures, please refer to IDEA's Back to School webpage: www.ideapublicschools.org/back2school2020.

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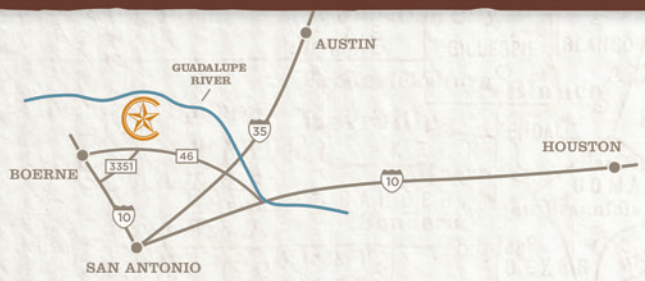

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