

## Pressure Pumpers Develop New Ways To Run On Natural Gas

By Colter Cookson

Investors, employees and the public expect the oil and gas industry to meet high standards. As they help deliver everything from electricity to the materials for cell phones, toys and tires, oil and gas companies must generate attractive returns while minimizing their operations’ environmental impacts.

Even when natural gas prices were much higher, there was a strong economic case for using dual-fuel and electric fleets. As gas prices have pulled back, those economics have only become stronger, says Chris Fournier, director of equipment engineering at ProFrac Services. “Each Mcf of gas can displace about eight gallons of diesel. When gas is below \$3 an Mcf and diesel is above \$4 a gallon, the savings add up quickly,” he reports.

Fournier adds that both fleet types cut greenhouse gas emissions. “The biggest constraint around dual-fuel and e-fleet adoption is gas availability,” he assesses. “In a field without ready pipeline gas, compressed natural gas will need to be brought in, or field gas will need to be treated so it can be used. Both options, however, add costs that can impact the economics associated with displacing diesel.”



In oily plays that generally produce rich gas, bringing in CNG tends to be more affordable than conditioning field gas, Fournier advises. “In West Texas, almost all our dual-fuel fleets run on CNG,” he illustrates. “The field gas is rich and low-pressure, so to utilize it, we need to compress it, condition it and then bring the pressures back down. Tally those costs, and it usually makes more sense to run on CNG.”

“Over time, the industry will push to use more field gas in basins that traditionally use CNG,” he predicts. “Many of these plays may have takeaway capacity constraints, which means operators will have to transport associated gas by truck, flare it, restrict their production or find a way to use the gas. At today’s prices, repurposing the gas can make more sense than paying to transport it.”

To render field gas usable, companies often condition it or blend it with CNG, Fournier outlines. In some plays, he says, electric fleets can simplify conditioning because their power generators tolerate higher Btus than dual-fuel engines. “Sometimes it only takes minimal conditioning to make field gas suitable for a generator,” he says. “We may have to run compression to get the gas to the higher pressures e-fleets require, but that can cost less than handling both Btus and pressure.”

E-fleets’ tolerance for rich gas can enable operators to move away from diesel in plays where CNG is unavailable or costly, Fournier adds. “That will be a huge benefit, especially in basins that may have takeaway issues in the future,” he says.



**This gas conditioning skid from ProFrac Services is enabling a hydraulic fracturing fleet to run on field gas by removing contaminants such as liquids, condensates and chemicals. These skids may become more common as the industry looks for ways to use stranded gas.**

### Optimizing Conditioning

Fournier points out that ProFrac provides gas conditioning services with equipment it manufactures in house. He says internalizing gas conditioning has helped the company achieve high substitution rates reliably.

“The biggest hurdle when running a dual-fuel fleet is getting consistent pressure across the system,” Fournier details. “The hard starts and stops that occur at the beginning and end of each stage make for a strenuous environment, but we can compensate for that with the right pressure regulation system. Designing that system is much easier when we know the equipment, the demands placed on our pumps, and the conditions we will encounter on each pad.”

To run on field gas, fleets must account

for changes in its composition during a job. “In an area where operators are drilling into several formations, the quality of the gas we pull from the gathering system can swing based on which wells are producing at a given time. We also have to watch for liquids, condensates, pipeline chemicals or other contaminants,” he explains.

Monitoring gas quality is essential for safety, Fournier emphasizes. “The second we sense gas outside the range we have identified for the specific pad and equipment, we automatically shut off the gas and switch to 100% diesel. This protects the engines before any catastrophic damage occurs,” he assures.

Instead of monitoring Btu levels with gas chromatographs, ProFrac uses meters from JP<sup>3</sup> Measurement LLC. “Chromatographs work great, but they require more time to get readings and often need to vent the sample gas they pull,” he observes. “With our monitoring technology, we can get a real-time view of the gas stream, and we have no emissions because we do not need to vent.”

While gas conditioning equipment has become more efficient and reliable with time, Fournier says the biggest step-change involves digitization. “When dual-fuel fleets first kicked off, we had the ability to look at the gas coming into the pump and see how much gas individual engines were substituting, but we did not have great visibility into what was happening before the gas reached us,” he recalls. “Today, we can check every piece of equipment we are running remotely, which makes troubleshooting much faster.”