



Zero-emission Alternatives to Pneumatic Control

How Ready are Technology Providers to
Meet Increased Demand?

About this report

This work was prepared on behalf of Environmental Defense Fund [edf.org](https://www.edf.org) and Clean Air Task Force [catf.us](https://www.catf.us).

About Datu Research [daturesearch.com](https://www.daturesearch.com)

Datu Research is an international consulting firm that provides the right data to the leading foundations, NGOs and governments that are working to solve humanity's most important challenges, including food security, soil health, and climate change.

Acknowledgements

The authors are grateful to the interviewees who generously contributed their time and expertise to this project.

Companies and policy views

Inclusion of company names in this report does not imply a position on federal or state policies regarding methane emissions. Errors of fact or interpretation remain exclusively with the authors. We welcome comments and suggestions.

Cover photo

Courtesy of Emerson.

Contact

Inquiries can be directed to: mloewe@daturesearch.com.

Contents

Executive Summary	2
I. Introduction	4
II. How Ready Are the Technology Providers?	5
1. A well-established, capable set of technology providers is in place.....	5
2. The target technologies are mature and designed to integrate into existing systems.	8
3. Technology providers already see strong demand for retrofits and new installs.....	9
4. Technology providers have coping strategies for current supply chain challenges.....	10
5. Providers are confident in their ability to expand production capacity so long as they have regulatory certainty and steady demand over multiple years.....	11
6. The MERP is already increasing demand for zero-emitting alternatives and will likely bring innovation and new technology providers into the US market.....	12
III. Technology Provider Close-ups	13
<i>Emerson: Electric Actuators</i>	13
Business case for O&G customers.....	14
Current supply chain challenges	14
Potential impacts of new EPA rule	15
<i>Westgen Technologies: Solar Hybrid Power Generation</i>	15
Business case for oil & gas operators	16
Current supply chain challenges	16
Potential impacts of new EPA rule	17
Timeline for serving the retrofit market.....	17

Tables

Table 1. 40 providers of zero-emission alternatives to pneumatic control, US and Canada	6
Table 2. The target technologies are mature and designed to integrate into existing systems.	8
Table 3. Technology providers already receive strong demand for retrofits and new installs.	9
Table 4. Technology providers have coping strategies for current supply chain challenges.	11
Table 5. Technology providers are confident in their ability to expand production capacity so long as they have regulatory certainty and steady demand over multiple years.....	11
Table 6. The MERP is already increasing demand for zero-emitting alternatives and will likely bring innovation and new technology providers into the US market.	12

Executive Summary

Pneumatic control systems using natural gas as the pneumatic medium are used widely in the oil and gas industry, and these systems routinely vent methane into the atmosphere. A variety of zero-emission alternatives to natural gas-driven systems are commercially available. The U.S. Environmental Protection Agency is in the process of finalizing new rules requiring oil and gas operators to use these zero-emission technologies for new and existing sources.

This report identifies 40 providers of the relevant technologies. In the spring of 2022, we interviewed a 9-company sample to document these providers' ability to scale up production to meet anticipated demand within the timeline of the upcoming EPA rules.

After those initial interviews, the U.S. Inflation Reduction Act (IRA) was signed into law in August 2022, with a provision, the Methane Emission Reduction Program (MERP), which may drive incentives for oil and gas companies to adopt zero-emitting control systems. These incentives are likely to drive demand earlier than would be anticipated otherwise. For this reason, we re-interviewed five firms in our sample to ask how they anticipate the added impact of the MERP will affect their business.

Our two rounds of interviews with technology providers resulted in the following six key findings:

- 1. A well-established, capable set of providers of the target technologies is in place.** We gathered a non-exhaustive list of 40 technology providers that represents a snapshot of a diverse and growing set of capable companies. Several of these providers manufacture long-established technologies widely used in many industries in addition to the oil and gas industry—including electric actuators and instrument air compressors—while others have newly emerged over the past 2-6 years to provide innovations like remote power sources and new electric actuators that have the same torque capabilities as pneumatics.
- 2. The target technologies are mature and designed to integrate into existing systems.** Electric actuators and instrument air compressors are common industrial equipment that have been in use for decades. Providers of heavy-duty industrial air compressors especially emphasized that it is not necessary to significantly change their product design to replace gas-driven systems. One such provider noted, “They're just changing from natural gas actuation to compressed air, and there's no need to change the design; it's a cylinder actuated by pressure and it doesn't matter whether it's gas or air.”
- 3. Technology providers already see strong demand for retrofits and new installs.** Providers reported that their oil and gas clients are choosing alternatives to natural gas-driven pneumatics not only in light of the new rules, but also to increase reliability,

simplify maintenance, enhance safety, keep valuable product in the sales line, and open the way to digitizing their fields to benefit from the Industrial Internet of Things (IIoT).

- 4. Technology providers have coping strategies for meeting current supply chain challenges.** Whether large or small, companies reported currently having to wrestle with procurement delays. Coping strategies include storing extra quantities of supplies in anticipation of shortages; bringing in more procurement personnel; going to different distributors; paying higher prices for parts; finding contract manufacturing sites for key items such as circuit boards; spot-buying on the open market. Providers express hope that acute supply chain issues will resolve over time. Larger, more diverse companies seem advantaged by their long-term supplier relationships.

- 5. Even considering the current supply chain concerns, providers have confidence in their ability to expand production capacity so long as regulatory certainty helps keep demand steady over multiple years.** One interviewee noted that technology providers in this industry are adept at responding to rising demand—as long as the rise is sufficiently steady to justify the capital investment in expanding production capacity. Another emphasized, “Having regulatory certainty is very important. Having a period of time that this can be implemented for is just as important for the suppliers as it is for the oil and gas operators.”

- 6. The MERP is already increasing demand for zero-emitting alternatives and will likely bring innovation and new technology providers into the US market.** MERP increases incentives for oil and gas operators to reduce emissions, and it activates these incentives in the coming years. Technology providers say that customers are already engaging with them in response to the IRA. More to the point, it is spurring an increase in purchase orders. “All of this has an undercurrent of what makes good business sense,” said one provider. “Companies were interested before, for business reasons, and now this [the MERP] will accelerate the transition.”

I. Introduction

In 2023, The U.S. Environmental Protection Agency expects to finalize new rules requiring oil and gas operators to use zero-emission alternatives to natural gas-driven pneumatic control systems. The rules will apply to new and existing sources. A well-established group of providers supply zero-emitting alternatives, and they are experiencing strong demand for these technologies in the oil and gas sector. While consistently reporting recent difficulties in securing their supply chains, they also expressed confidence in increasing their future capacity to supply this growing market if there is regulatory certainty and steady demand for their products.

In August of 2022, the U.S. Congress passed the Inflation Reduction Act, including a provision called the Methane Emissions Reduction program (MERP). A program that will be administered by the EPA, MERP will drive emission reductions in several ways. Among the most important of these is that it will assess a fee on excessive methane emissions from oil and gas operations. Beginning in 2024, oil and gas operators will be assessed a fee for any emissions above a certain threshold. Another important provision is that, within the next two years, EPA is directed to update emission reporting protocols based on empirical data—which will improve accuracy by ensuring reported emissions closely reflect those actually occurring in the field. Perhaps most important, MERP incentivizes operators to drive down emissions in the near term.

This research addresses the commercial availability of technologies in the United States and Canada that will help oil and gas operators reduce their methane emissions and comply with the new zero-emission rules. The report identifies the providers of each technology, and, based on interviews conducted in the spring and fall of 2022, reports their estimated ability to meet future demand for zero-emitting technologies for both new and existing sources.

The zero-emitting technologies in this report include the following:

- Electronic controller systems (grid-powered)
- Electronic controller systems (solar-powered)
- Instrument air controller systems (grid-powered)
- Instrument air controller systems (solar-powered)
- Electronic controller and instrument air controller systems (hybrid solar-gas)
- Zero-Emission Emergency Shutdown Systems
- Nitrogen-powered controllers

Several of these are long-established technologies widely in use in many industries beyond the oil and gas industry (electric actuators, instrument air compressors), while others—like new electric actuators that have the same torque capabilities as pneumatics—have emerged over the past 2-6 years. An additional recent advance is that electric actuators, when connected to digital platforms such as Supervisory Control and Data Acquisition (SCADA), now enable operators to see the relevant field conditions remotely, in real time.

II. How Ready Are the Technology Providers?

The EPA has received comments from oil and gas operators expressing concerns about the availability of zero-emitting control systems once the rules are finalized, but these concerns were not accompanied by specific detail. To help fill this information gap, this report focuses on the providers of the technologies, their current capabilities, and their potential ability to scale up their capacity within the anticipated timeline of the new rules.

1. A well-established, capable set of technology providers is in place.

Our research identified a list of 40 companies that provide the oil and gas industry with the above-listed zero-emission alternatives to natural gas-driven pneumatic control systems (see Table 1 on next page). Most companies manufacture at least one device in the systems they provide to their oil and gas clients, sometimes packaging their technology with devices manufactured by other companies. For instance, Alberta-based Westgen Technologies manufactures a solar power system and packages it with other providers' instrument air compressors. Stocking distributors such as Texas-based VanZandt Controls carry relevant products from an array of manufacturers and are well versed to advise operators on which zero-emission configurations fit their needs.

Not exhaustive, this list of companies represents a snapshot of a diverse and growing set of technology providers. Many of the 40 listed are mature companies that have served the oil and gas industry for decades. The median number of years in operation is 43 years, ranging from the oldest company, in operation for 181 years, to the youngest one, operating for two years. The companies fall into size categories ranging from 10,000+ employees to 2-10 employees.

A further indicator of the diverse characteristics of these companies is the number of industries they each serve. Numbers of industries served are not strictly comparable—since companies do not sort them into uniform categories—but they do indicate that a company's capacity is spread out across multiple sets of customers. While 13 of the companies in our list exclusively serve the oil and gas industry, the median number of industries served is 5, indicating that most of the companies are well-established in markets both within and outside the oil and gas industry.

Table 1. 40 providers of zero-emission alternatives to pneumatic control, US and Canada

Company	Industries served	Year Founded	Electronic Controller GRID electric actuators	Electronic Controller SOLAR electric actuators	Instrument Air Controller GRID compressors	Instrument Air Controller SOLAR compressors	Electronic or Instrument Air HYBRID SOLAR GAS	Zero-Emission Emergency Shutdown	Other remote power source	Nitrogen-powered controllers	Employees	HQ State or Province
Air Works Compressors	1	2007				Y					11-50	AB
Alert Control Technologies	1	1995				Y					11-50	TX
Ameresco Solar	17	2000		Y							11-50	TX
Ametek	6	1930	Y								10,001+	PA
Applied Control	8	1962	Y					Y			51-200	CO
Auma	5	1976	Y								51-200	PA
Axiom Technologies	1	2014				Y					11-50	TX
Bauer Compressors	10	1946			Y						201-500	VA
Beck Electric Actuators	9	1936	Y								51-200	PA
Bernard Controls	11	1949	Y								501-1,000	TX
Bray	12	1986	Y								1,001-5,000	TX
Calscan	1	1995		Y				Y			11-50	TX
ChampionX	4	1981	Y						Y		5,001-10,000	TX
Circor Energy	8	1999	Y								1,001-5,000	MA
Cream Energy Group	1	2017				Y	Y				11-50	AB
Curtiss-Wright	4	1929	Y								5,001-10,000	NC
Dresser Utility	7	1879	Y								201-500	TX
Emerson	4	1890	Y					Y			10,001+	MO
Exlar	10	1990	Y								51-200	MN
Flowserve	5	1997	Y								10,001+	TX
Indelac	4	1986	Y								11-50	KY

Company	Industries served	Year Founded	Electronic Controller GRID electric actuators	Electronic Controller SOLAR electric actuators	Instrument Air Controller GRID compressors	Instrument Air Controller SOLAR compressors	Electronic or Instrument Air HYBRID SOLAR GAS	Zero-Emission Emergency Shutdown	Other remote power source	Nitrogen-powered controllers	Employees	HQ State or Province
InstrumentAir	2	2007			Y	Y	Y				11-50	CO
Jflow Controls	10	2001	Y								51-200	OH
Kathairos	1	2020								Y	2-10	AB
Kimray	1	1948	Y								501-1,000	OK
Master Flo	1	1979	Y	Y							201-500	AB
NOV	1	1841	Y								10,001+	TX
Pembina Controls	7	1964			Y	Y					11-50	AB
Qnergy	2	2009			Y				Y		11-50	UT
Quincy Compressor	19	1920			Y						51-200	AL
Rotork	6	1957	Y								100	NC
Schlumberger	1	1926	Y								10,001+	TX
Siemens Energy	6	1847	Y								10,001+	DC
Solar Turbines	13	1927					Y				5,001-10,000	CA
Spartan Controls	11	1963	Y								1,001-5,000	AB
Tolomatic	24	1954	Y								201-500	MN
Trido Solutions	1	2010				Y					11-50	CO
VanZandt Controls	1	2015	Y	Y	Y	Y	Y	Y	Y		51-200	TX
Venture Manufacturing	18	1971	Y								51-200	OH
Westgen	1	2019			Y	Y	Y				51-200	AB

In our list of 40 companies, the total number of provider companies in each technology category is as follows:

Electronic Controller GRID (electric actuators)	Electronic Controller SOLAR (electric actuators)	Instrument Air Controller GRID (compressors)	Instrument Air Controller SOLAR (compressors)	Electronic or Instrument Air HYBRID SOLAR GAS	Zero-Emission Emergency Shutdown	Other remote power source	Nitrogen-powered controllers
25	4	7	9	5	4	3	1

For this report, we interviewed a 9-company subset of these 40 providers, speaking with most participant companies both before and after the IRA/MERP legislation passed into law.

2. The target technologies are mature and designed to integrate into existing systems.

Electric actuators and instrument air compressors are common industrial equipment in use for decades in many industries. Providers of heavy-duty industrial air compressors especially emphasized that there is no need to significantly change their product design to replace gas-driven systems. One provider, Alberta-based Kathairos, provides an alternative approach—a nitrogen-driven controller that can replace natural gas at a 1:1 ratio and requires just a two-hour installation. The company operates as a services model, leasing and servicing nitrogen-powered controllers and providing the needed nitrogen.

Table 2. The target technologies are mature and designed to integrate into existing systems.

Quote from Technology Provider	Employees
“We supply a lot of valves and pneumatic controls for the valves. They've been around a long time. They're just changing from natural gas actuation to compressed air, and there's no need to change the design; it's a cylinder actuated by pressure and it doesn't matter whether it's gas or air.”	11-50
“We are dealing with such basic materials and longstanding technology. The closest thing to a delay is crossing the [Canada-U.S.] border.”	2-10
“Some third-party vendors work on our actuators and valves. Our products are components that can be integrated into solar systems.”	5,001-10,000
“We focus on pre-engineered configurations of different physical sizes and that allows us to integrate into different systems. We enable the use of typical off-the-shelf compressors. We have the ability to use a wide range of suppliers	51-200

for different scales. We can use several manufacturers.”	
--	--

3. Technology providers already see strong demand for retrofits and new installs.

For this report, we conducted 17 interviews with a sample of nine companies. The breakout of the technologies they provide is as follows:

- Electric actuators: 5 providers
- Instrument air compressors: 5 providers
- Remote power sources: 4 providers

Additional characteristics of the 9-company sample:

- Company ages range from 2 years to over 100 years.
- All companies have either fewer than 200 employees or more than 1,000.
- The companies serve all gas-producing U.S. states, Alberta, and British Columbia.
- Two companies also serve oil and gas clients in Mexico.

In interviews, providers indicated that there is strong demand for zero-emitting alternatives in the oil and gas sector. Customers see a compelling business case for adopting the technologies in addition to the obvious benefit of not venting saleable product into the atmosphere. Advantages include savings on the maintenance costs of using wet gas to drive pneumatic devices; electric actuation or dry instrument air each mean less downtime. Enhanced safety is a significant advantage, given that venting produced gas creates a flammable atmosphere, endangering workers. Electric actuators also have the ability to connect to digital platforms such SCADA, enabling operators to see the relevant field conditions remotely, in real time.

The nine companies in our sample differed dramatically in the percentage of their business that constitutes retrofits versus new sources. Five companies reported serving mostly retrofits, ranging from 60 to 90 percent of their business. Three reported serving mostly new sources, and one company reported an even split of 50/50.

Table 3. Technology providers already receive strong demand for retrofits and new installs.

Quote from Technology Provider	Employees
“Some big sites that did [gas pneumatics] are now doing electric because of maintenance reasons.”	1,000-5,000
“Providing more electric control is 100 percent on our minds. Our customers are clamoring for it, so we are providing those systems.	5,000-10,000
“There is a balance of people going to all-electric and they see the writing on the wall. Pneumatics is on the pie chart.”	10,000+

“For the oil company, they like the electric because they can tie it back to the SCADA system. The distances are huge in this part of the country. Historically a person drives a truck six hours to get to the location, so being able to use the automation, that reduces labor costs and improves safety.”	51-200
“Our team delivers 5 devices to a site for the operator to try, and as our guy is driving off the site, the customer calls and says, ‘Go ahead and send 100 more.’ And then later that day, they call back and say, ‘Make it 200.’”	10,000+
“We had anticipated small producers (like 50 wells), but we’re getting bigger producers both in Canada and the US. Now our customer size is growing fast.”	2-10
“These are building-size compressors. Again, they used to use gas but most of them now are instrument air. To convert them is costly. Any new site will be instrument air.”	11-50
“The impact of what the industry is doing right now is phenomenal. Previously it was grudgingly adopted (5 years ago), and now the mindset has changed. Companies are doing it because they want to.”	51-200
“We have had 300% growth every year since we entered the oil and gas market in 2018...This year is tremendous. People are saying, “I have 100 holes with pneumatics,” so we get orders for hundreds of systems at a time. We didn't expect the United States to move as quickly as Canada did. Now the oil and gas operators are trying to stay ahead of the curve.”	11-50

4. Technology providers have coping strategies for current supply chain challenges.

Companies consistently reported facing difficult supply chain issues at the moment, especially for electronics. A common theme is managing inventory to help mitigate supply problems. Several companies also shared their strategies for alternate sourcing, including bringing in more procurement personnel, substituting alternate components on circuit boards, going to different distributors, paying higher prices for parts, and paying for air freight. In general, the larger, older, more diversified firms seem to have advantages over smaller, newer companies in navigating these challenges, especially when it comes to electronics. One exception is an air compressor provider that reported that while materials are currently a supply challenge, they don't have many electronic systems in their units. Since most of the controls are relay logic—using simple, hard-wired signals—they are easier to procure.

Table 4. Technology providers have coping strategies for current supply chain challenges.

Quote from Technology Provider	Employees
<i>Coping Strategies:</i>	
“We concentrate on local so we can do better where we are. We manage our inventory to help mitigate supply problems.”	1,000-5,000
“We're doing what everyone else is doing: trying to improve alternate components on the circuit board, going to different distributors, paying extra to get parts, paying for air freight. Unfortunately, the industrial sector does not drive the electronics industry, it's the computing industry, not us. We don't get priority as the world comes back from COVID.”	10,000+
“I could deliver double out of my factories now, but [there are delays in] getting circuit boards. Electronic [components] would make it take 6 months.”	10,000+
“We could triple our production tomorrow, and delivery to the customer would be pushed to about 20 weeks. That’s <i>our</i> capability; again, the biggest problem would be getting material.”	11-50

5. Providers are confident in their ability to expand production capacity so long as they have regulatory certainty and steady demand over multiple years.

Even considering the current supply chain problems, technology providers expressed confidence in their ability to respond to growing demand in light of the anticipated EPA rules. One provider who has served the oil and gas industry for over 25 years noted that previously, when new requirements have come out, concerns have been raised that the supply of needed technology would become a bottleneck—yet these concerns were not realized. Instead, the providers adapted quickly. According to several providers, what’s needed for companies to dramatically expand their production capacity is steady demand across a multi-year period. Regulatory certainty helps provide the stability they need to invest in capital improvements for ramping up production.

Table 5. Technology providers are confident in their ability to expand production capacity so long as they have regulatory certainty and steady demand over multiple years.

Quote from Technology Provider	Employees
“With respect to the size of the company, it's important, whether you're small or big, to see that this is going to stay. That it's not going to change because of transitions in [Washington] DC.”	5001-10,000
“If our orders were to double, we would probably have to move to 12-13 weeks [to deliver to the customer]. We have a giant facility that has the capabilities, so we can grow into it.”	11-50

“The industry is amazingly adept at responding to demand. As long as the change in demand is steady. As a small company, we are good at adding capacity and can move very fast. We can absorb it and never look back <i>if</i> everyone believes it's going to be sustained and not go away; that's the key. But it's another story if you're at risk of that demand going away 12 months later.”	51-200
“Having this regulatory certainty, I think, is very important. Having a period of time that this can be implemented for is just as important for the suppliers as it is for the oil and gas operators.”	51-200
“It would not take us long to double our output. The skilled labor going into each unit is readily available. It's really supply chain, and that will improve over time.”	11-50

6. The MERP is already increasing demand for zero-emitting alternatives and will likely bring innovation and new technology providers into the US market.

The IRA’s MERP provision may help provide suppliers additional confidence needed to invest in increasing their production capacity. MERP increases incentives for operators to drive down their emissions, including through adoption of zero-emitting devices. It also activates these incentives in the near term, since MERP’s fee on excessive emissions begins in 2024.

Technology providers say that customers are already engaging with them in response to the IRA, and that MERP’s new incentives to operators are having a marked effect on demand. This is spurring a welcome boost in current purchase orders. Providers anticipate that this will result in increased U.S. innovation and a greater number of international companies entering the U.S. market for the relevant technologies.

Table 6. The MERP is already increasing demand for zero-emitting alternatives and will likely bring innovation and new technology providers into the US market.

Quote from Technology Provider	Employees
“Relative to the oil and gas market being volatile, quick to ramp up and down, creating a steadier demand gives us more confidence to invest in materials and invest cash into inventory because of expected orders. So even though we can’t fully anticipate the future, [MERP] does reinforce our confidence.”	5,001-10,000
“MERP further reinforces our position that electric valve operation is the future. Our customers who are in tune are getting rid of their pneumatics. That’s always been under pressure from the EPA, but now with the IRA it’s increasing; we have an uptick in our orders already. We are seeing demand higher than we’ve ever had.”	5,001-10,000
“The MERP incentives to transition quickly are probably good for all the	2-10

technology providers, but especially for us, because we are a service provider. The more rapidly we can cover a larger network of customers, the more rapidly we can bring down costs. We have no concerns whatsoever about scaling up.”	
“Customers are already engaging with us in response to the IRA, and our technologies will enable them to reduce their methane emissions and the fees they pay. All of this has an undercurrent of what makes good business sense. Companies were interested before, for business reasons, and now this [the MERP] will accelerate the transition.”	1,001-5,000
“Companies should be able to scale rapidly. Everybody is good at forecasting, but what drives it is current purchase orders. With MERP incentives on the front end, we should see a large demand spike. Our industry is quick to respond to demand when someone is actually writing a check for it.”	51-200
“The IRA provisions will massively spur clean tech growth and innovation in the US. It will attract international companies who will want to do business in the US because that’s where the growth will take place.”	51-200

III. Technology Provider Close-ups

Emerson: Electric Actuators

Emerson is an industrial technology company with approximately 87,000 employees. Founded in 1890, it has two main business platforms: industrial automation solutions and commercial/residential solutions. The company provides equipment and control systems to help customers automate their processes in a variety of industries, including oil and gas, electric power, chemical, pulp and paper, and others. The oil and gas industry, including upstream and midstream, accounts for 17% of Emerson’s business. Low- and zero-emission products have been on offer for many years, while a zero-emission regulator product line was established over five decades ago. The company also offers zero-emission electric actuators and hydraulic actuators.



Photo courtesy of Emerson

We sought to learn Emerson’s perspective on how the proposed EPA rules will affect production of its electric actuators and the company’s ability to meet the anticipated increase in demand.

The information in this close-up is based on a conversation with Tom Brandau, Vice President of Fisher Instrument Business Unit, an Emerson product line for control valves and actuators.

Business case for O&G customers

Demand for zero-emission products has already been steadily increasing in the upstream oil and gas industry. “Our electric actuators have seen more than double the volume over the five-year period,” says Brandau, “and we've seen a decrease in our pneumatic products in that same space.” What is motivating operators to go electric? One factor is reducing the amount of valuable gas that’s wasted. The operator pays royalties on the gas coming out of the well, so by venting a portion that could otherwise be sold, operators are forgoing revenue. Electric actuation captures that value and pays off over a couple of years, notes Brandau.

Another factor is that electric devices open the way to digitizing the management of oil and gas fields. This gives operators the ability to take mechanical devices that aren’t intelligent and aren’t connected, and replace them with devices that keep information flowing continuously, including what is happening below the ground, inside the separator, and inside the process units. Brandau notes that by monitoring and displaying all this information in real time, intelligent systems literally enable an operator to manage gas fields from a cell phone. “If you Venn diagram digital transformation and what's zero emission, there’s a lot of overlap.”

Current supply chain challenges

Like others in oil and gas and other industries, Emerson is confronting supply chain challenges at the moment, especially for electronics. Some issues are related to COVID, and others not. Electronics supply, for instance, was tightening even pre-COVID because the automotive sector is turning to electric cars, along with an ever-increasing number of onboard computers and entertainment systems. Cell phones and other consumer devices also snap up the available electronics. “Emerson was a relatively big buyer in the electronics supply market a few years ago, says Brandau. “Now, even though we’re buying in similar volumes, we’re considered a very small buyer.” The unit counts that an Emerson will buy, compared to a Tesla or Samsung or Apple—that makes a big difference in buying power, putting anyone who operates outside the automotive or consumer electronics industry at a disadvantage.

Despite these supply chain constraints, Emerson has managed to steadily deliver products to its customers over the past 2-3 years. How did it manage? To some extent, by doing what others in the industry are doing: storing extra quantities of supplies in anticipation of shortages; finding contract manufacturing sites for key items such as circuit boards; spot-buying on the open market—a move the company formerly made perhaps once a year, but now finds necessary almost weekly. “We buy things twice the price, five times the price, 100 times the price, to ensure part supply is available,” Brandau says.

What helps Emerson most with the current supply chain issues, though, is that the company has been providing low- and zero-emissions products for so many years. Its product lines and supply chains are well established, with longstanding relationships. Brandau says this means that when things get tight, it's like having a lever to pull, versus having to figure it out for the first time. This holds for raw materials as well as electronics.

Potential impacts of new EPA rule

When the EPA rule is finalized, how will Emerson plan to increase production, and by how much? In the past, when new regulations were introduced, the company saw an increase in demand for its products. Some substitution may occur, in which demand for some products goes down, but generally regulatory changes lead to investment in new and existing installations, resulting in a significant increase in production for Emerson. For instance, over the past 12 months, the company has doubled capacity for its Fisher easy-Drive electric actuators for the upstream oil and gas market. This put a strain on its supply chains, but the company intends to continue to grow the product line, possibly doubling again over the coming 12 to 18 months.

Most of Emerson's products are used across several industries, which helps absorb the impact of increases in orders. Brandau notes, "Even if our oil and gas segment doubles, the effect across the board may only be a 20% increase. For us, that's the big piece: because we're diversified, because we're a large enough business, we've got that flexibility."

Typically, Emerson's oil and gas clients are putting in new wells, and they try to equip them with the best technology they can. For electric actuation in that space, the current split is approximately 70% new wells and 30% retrofits. Brandau notes that after OOOOa came out, demand for retrofits varied regionally, depending on state regulations. In states such as California and Colorado, for instance, state requirements regarding emissions led some operators to replace existing equipment with electric actuators. "And that helped because it provided a bit of a ramp-up. Because not everybody came on all at once."

Westgen Technologies: Solar Hybrid Power Generation

Westgen Technologies is an Alberta-based provider of solar hybrid power to the oil and gas industry, often in combination with instrument air compressors. Founded in 2019, Westgen stepped in to fill the prevailing "remote power generation gap" that existed between widely available small sources of power (up



Photo courtesy of Westgen Technologies

to 500 watts) and much larger sources, which were also widely available. Between those two endpoints, Westgen found an absence of technologies that were right-sized to reliably power an instrument air compressor along with all the new data capture that new well sites are using—a size typically in the 1-35 kilowatt range. The company fills this gap with its solar hybrid system, the EPOD, which stands for “engineered power on demand.”

For this close-up, we spoke with Ben Klepacki, Co-Founder and Chief Operating Officer of Westgen Technologies.

Business case for oil & gas operators

Westgen’s customers find it in their best interest economically to eliminate the venting of methane. Klepacki says this is for three “increases:” increased reliability, revenue, and safety. Greater reliability results from the fact that gas coming out of a well is saturated with water, and as it goes through a line to run a valve or controller in cold weather, it can freeze, bringing down the site. Moving to a dry instrument air system or electric actuation means more uptime and more gas sold. An additional revenue boost comes from selling gas that was previously lost through venting—or essentially blowing dollars out into the air.

Also crucial to oil and gas operators is the safety case. Venting creates a flammable atmosphere. Especially when the valves are in a building, or even in a small area, the gas can linger, and any spark poses a safety risk. Eliminating methane venting creates a much safer working environment. Safer companies have more access to labor and better safety reports in their annual meeting. Safety is something companies know they have to pay attention to.

As for the economics of new builds versus retrofits, Klepacki notes, “The numbers generally favor new builds because operators have no sunk costs there. But the value proposition is the same.” He estimates that 60 percent of Westgen’s current business is retrofits, perhaps in part because there are far more existing sites than new ones being drilled. The scale of investment by operators, he notes, has a lot to do with steady regulations. “Operators aren't as concerned about what the regulation is,” he says. “It's about *knowing* what it's going to be and that it stays that way.”

Current supply chain challenges

Westgen is also experiencing what others in the industry report regarding shortages of electronics and raw materials. Recent issues with the supply chain are making it difficult to fill orders without delays. It now has nearly 200 units in its backlog. “We'll probably finish the year in that 300-ish range,” says Klepacki. “But we're going to be fabrication-limited, not sales-limited.”

Current challenges in procuring electronics may be the hardest to solve, given that global chip demand continues to rise, and the oil and gas industry is waiting in line behind much larger purchasers like the automotive and consumer device industries. “Even from a retrofit standpoint, oil and gas is a very minor blip in that global demand,” says Klepacki. To address these issues, Westgen is prioritizing hiring people who have the proven ability to find sources and negotiate contracts with suppliers. “We're spending a tremendous amount of time trying to figure out how to secure our supply chain.”

Potential impacts of new EPA rule

If the EPA rule is finalized, how much does Westgen anticipate increasing its production? The company has already expanded its Canadian facility to 46,000 square feet, implementing lean manufacturing capabilities to maximize throughput. On the horizon is the potential opening of a US-based manufacturing facility that, depending on regulations and client demand, would likely double or triple Westgen’s capacity. It takes about six months to get such a facility up and running. “If we have good business confidence that we need to start multiple facilities at once,” Klepacki says, “we could take about eight months for multiple ones or spend less time starting just one.”

Timeline for serving the retrofit market

Westgen notes that the providers of zero-emission alternatives to natural gas-driven control systems need a multi-year period in which to adequately ramp up production.

"If everything has to be done in too short of a window," says Klepacki, “it just kind of implodes that whole production capacity for all these critical components. So that really puts stress on all the components and suppliers that make this achievable.”

Air compressors are an example. The oil and gas industry is not among the air compressor manufacturers’ usual customers—which include general manufacturing, food and beverage production, aerospace, and others. A sudden burst in demand from the oil and gas industry could lead to delays on top of those already faced by technology providers because of acute supply chain issues. Given adequate time, compressor providers could almost certainly adjust. But even large providers may hesitate to invest in expanding their capacity for an overly short time window.

Klepacki suggests that instead of giving a single date for compliance, the rule for retrofits could be phased in steadily over time. This tiered implementation could enable, for instance, a multi-year phase-in, in which operators must retrofit a minimum portion of their sites per year. This tiered schedule would be beneficial to the entire supply chain for the needed devices.

“The more forecast we have, the more confidence there is in the market to say, "Okay. I see what the need is, and I can see it far enough out that I can address it both short and long term.”
