

Siemens Energy remains focused on customers as industry evolves

The drive to decarbonize the energy sector has enabled Siemens Energy to evolve. By **Keefe Borden**

Erhard Eder, Senior vice president, industrial applications for Siemens Energy, has seen his share of change in an essential industry that has seen an ongoing evolution over the last 30 years. Managing that state of constant change has become a specialty of its executives who have kept the company relevant. The ongoing advances in digital technology has enabled the energy industry to control costs and extend the reach for energy products to areas of the world that would not otherwise have them. More lately, the drive to decarbonize the energy industry has led Siemens to search for alternatives. Amid the ongoing series of changes there are some

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constants. For one, the need to listen to clients and understand their unique needs.

In general, what near-term changes do you see in the aftermarket service of compressors in the gas compression industry?

Decarbonization and digitalization have prompted significant changes in the aftermarket service of compressors. Increasingly, operators are looking to brownfield solutions, including upgrades of decades-old installed compressors, to reduce emissions. Already prevalent in some regions, electrification of compressor drivers – another carbon-cutting technique – is gaining momentum in areas with increased access to renewable power sources.

In parallel, digitalization has enhanced our compressor service. Advances in sensor technology and data analytics have opened new possibilities in remote monitoring and diagnostics. Accordingly, performance-based availability contracts are gaining traction to help ensure continuity of operations—especially true during the pandemic.

How is Siemens Energy positioning itself to stay relevant within that vision for the future?

We have developed several solutions to help customers meet their decarbonization and other performance objectives. These include high-energy-efficiency compressors, and gas- and steam turbine-drivers; and an advanced dry gas seal (DGS) system

to minimize the risk of methane leakage. Coupled with performance-based contracts, data-based solutions, such as our advanced remote diagnostic services (RDS) platform and long-term service program (FlexLTP), enable us to optimize compressor train performance.

Close collaboration with our customers is also critical to staying relevant, especially in emerging areas like decarbonization and digitalization. Co-creation sessions help us develop solutions to meet their evolving service needs.

There is a lot of talk about decarbonizing the energy sector. How is decarbonization likely to impact the installed base of compressors?

I'm proud to represent a company so deeply committed to combating climate change and elated to see the sector-wide engagement in the most pressing problem of our generation. We certainly have our work cut out for us. So far, the world is failing to meet the 2018 Intergovernmental Panel on Climate Change (IPCC) targets – halving emissions by 2030 and achieving near-zero emissions by 2050 – to limit global warming to no more than 1.5 °C (2.7 °F). The IPCC's recent Climate Change 2021: The Physical Science Basis points to the alarming effects: shrinking glaciers, vanishing coastlines, and natural catastrophes, to name a few. I am hopeful we can turn the tide.

I've discussed the impact of decarbonization on aftermarket equipment service. More fundamentally, it's driving global demand for natural gas, a cleaner alternative to other fossil fuels. Relative to coal, natural gas-fired open-cycle gas

turbines reduce specific carbon emissions by up to 50%. Advanced gas turbines with cogeneration can reduce emissions further.¹ In the U.S., natural gas has surpassed all other sources as the nation's primary power source; per the International Energy Agency, the shift from coal to natural gas contributed to the greatest per country decline in CO₂ emissions since 2000².

In addition, natural gas is key to addressing energy poverty in developing regions such as Africa, where 500+ million people still lack access to power, and a rapid ramp-up of renewables is not feasible.

With several industry forecasts pointing to a steady increase in the demand for natural gas over the next 15 years (declining only gradually after that), compressors and natural gas turbines will continue to play an integral role in the energy transition. Decarbonization is also driving the rapid growth of the hydrogen market.

What role, if any, does hydrogen have in the future of the energy sector in general, and gas compression in particular?

I envision an energy future in which natural gas, renewables, and hydrogen, complement one another to achieve net-zero by 2050. To elaborate on the specific role of hydrogen, blending even small amounts of it with natural gas as a power feedstock can significantly impact emissions. For example, just 10 vol% hydrogen would reduce CO₂ emissions by roughly 2.7%, which could result in a reduction of 1.26 million metric tons of CO₂ for a 600 megawatt (MW) combined-cycle power plant that runs for 6,000 hours a year at an average of 60% efficiency¹.

The International Renewable Energy Agency highlights hydrogen's potential contribution to achieving net-zero in its World Energy Transitions Outlook (2021), indicating that "hydrogen and derivatives will account for approximately 12% of final energy use by 2050."³ Today, 95% of hydrogen is grey, meaning it's produced from fossil fuels⁴, limiting its impact on emissions. IRENA's Outlook also states that, by 2050, two-thirds will be green – produced from renewable resources – and one-third blue,



Siemens Energy provides digitally enabled solutions, including Remote Diagnostic Services through MyHealth app, to help customers meet availability targets and ensure maximum uptime and ROI.

produced from natural gas coupled with carbon capture and storage. There's one caveat: reaching that level of green hydrogen production would require a massive 166,000-fold increase in electrolyzer.³

How significant a role will turbomachinery and compressors play in the emerging hydrogen economy? A significant one. We're already producing turbines that can accommodate hydrogen blends. In addition, compression plays a vital role in the production of blue hydrogen.

What are some technical challenges for using hydrogen in the energy infrastructure, and how is Siemens Energy confronting these challenges?

Compressors are essential to transporting and storing hydrogen; however, hydrogen presents technical challenges atypical with other process gases. Advanced technologies that address the compression requirements for hydrogen storage systems are essential to improving the commercial viability of the hydrogen economy. Our advanced hydrogen compressor concept uses a unique configuration to significantly increase head-rise-per-stage and enable the use of lower-cost hydrogen-compatible materials.

What does Siemens Energy offer in the way of reducing emissions?

A lot! Strictly speaking, we're more of an energy transition company than an energy company. I'll highlight a few ways we are reducing emissions relevant to my core area of responsibility: the aftermarket service of compressors and turbomachinery.

We are constantly assessing and enhancing our equipment to improve environmental performance. In addition to our existing high-energy-efficiency compressors and gas turbines, we are developing a turbine fleet that can run on 100 percent hydrogen by 2030. We are also harnessing waste heat to increase the overall efficiency of plants and other industrial assets with combined cycle conversions and heat transfer technologies, such as heat pumps. And as noted, our high-efficiency dry gas seals minimize the risk of methane leakage, which can have a significant environmental impact. We have been manufacturing and installing API 692-compliant DGS for decades for all compressor OEM nameplates.

What are some of the repairs and services Siemens Energy offers that differentiate you from other providers?

We offer operators peace of mind in a way that very few, if any, other service providers can. Our extensive range of capabilities and depth of innovation enables us to address customer needs on a variety of fronts effectively: availability and reliability, emissions reduction, equipment optimization, increased uptime, aftermarket service, and safety, to name a few.

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SOURCES

- ¹ Siemens White Paper: Hydrogen Power and Heat with Siemens Energy Gas Turbines, Thorbjörn Fors and Karim Amin (2020)
- ² API: Actions to Reduce Emissions Continue to be Led by Natural Gas (2021)
- ³ International Renewable Energy Agency (IRENA); World Energy Transitions Outlook (2021), pg. 24
- ⁴ IRENA: Green Hydrogen Supply a Guide to Policy Making (2021), pg. 7