EXECUTIVE OUTLOOK

Jill Evanko
President And CEO
Chart Industries, Inc.

NEXUS

BY DANIEL FOELBER

Chart Industries, Inc. (Chart), a provider of technology, equipment, and services related to liquefied natural gas (LNG), hydrogen, biogas, carbon dioxide (CO_2) capture, water treatment, and other energy and industrial gas applications, has swiftly and subtly built an integrated value chain that positions it at the forefront of the clean energy transition.

Over the last five years, Chart's market capitalization has grown from roughly US$1 billion to US$6.5 billion. It booked revenue of US$378.9 million in Q4 2021 and US$1.318 billion for the full year 2021, marking the highest quarterly and annual revenue in company history. But there's evidence to suggest that Chart's growth is still in the early stages.

Chart believes that in order to meet the growing requirements of the industries it serves, it needs to be in every phase of the liquid gas supply chain, including upfront engineering, service, and repair. To make good on that goal, Chart made a number of acquisitions in 2020 and 2021 related to clean power, clean industrials, clean water and food, beverages, and agriculture market opportunities within its specialty products segment. Specialty products accounted for around a third of Chart's 2021 sales. The segment supplies highly engineered equipment used in specialty end-market applications for hydrogen, LNG, biofuels, CO_2 capture, food and beverage, aerospace, lasers, cannabis, water treatment, and other industries. Every application within Chart's specialty products segment set a record for orders and sales in 2021 and had full-year order growth above 15%.

Continued on page 16

OF CLEAN

CHART ACCELERATES
INVESTMENTS IN THE
CLEAN ENERGY TRANSITION

A ChartWater BlueInGreen Ozone Dissolution System

L.A. Turbine's ARES AMB Turboexpander-Compressor On Skid Controller

L.A. TURBINE'S ROLE IN CHART'S PORTFOLIO

One of Chart's most significant specialty products' deals in recent history was the acquisition of L.A. Turbine (LAT) in Q3 2021 for US$76.6 million in cash. LAT is a global player in turboexpander design, engineering, manufacturing, assembly, and testing processes for new and aftermarket equipment. With LAT now in its portfolio, Chart can offer a more comprehensive "one-stop shop" solution, expanding its offerings in applications such as hydrogen and helium liquefaction, carbon capture and energy storage, industrial gas, natural gas processing, small-scale LNG plants, propane dehydrogenation plants, heavy hydrocarbon removal process for LNG plants, and petrochemical.

"It is an exciting time for Chart and L.A. Turbine as we now work together to bring our customers expanded solutions across multiple molecules, including nearly all types of energy sources and multiple industrial gas applications," said Jill Evanko, president and CEO of Chart. "L.A. Turbine is one of the only turboexpander engineering and manufacturing companies that can design and produce very specialized expanders, one of the longest lead time items in the hydrogen and helium liquefaction supply chain. With this capability in-house, we are further differentiated in liquefaction — not just from decades of experience but also from world-class efficiency and, now, significantly shorter and guaranteed delivery times."

LAT's application-specific turboexpanders complement Chart's heat-transfer systems and specialty product's segment and give Chart greater end-market diversity in hydrogen and helium liquefaction, as well as industrial gas, natural gas processing, power generation, and petrochemical applications. LAT also brings a robust aftermarket business to the table, which fits nicely into Chart's repair, service, and leasing segment. Chart called out LAT's strong engineering culture, which aligns with Chart's goal to offer broader technology solutions for its customers.

AN OPEN-MINDED APPROACH TO GROWING THE NEXUS OF CLEAN

Fast-growing companies can sometimes struggle to maintain a cohesive company culture when integrating newly acquired companies into their product and service portfolios. One of the biggest failures of conglomerates is to spend years attaching bolt-on acquisitions with Velcro and tape instead of permanent interconnections that foster alignment and lead to growth. Chart's solution — like the strategies of some of the most successful conglomerates such as Warren Buffett's Berkshire Hathaway — is not to acquire a company, uproot its leadership, and micromanage, but rather, give the company the freedom to be creative and innovate.

Chart has built what it calls its Founders' Innovation Team, which consists of the founders, presidents, and other leaders from companies it has recently acquired like LAT, AdEdge, BlueInGreen, Cryo Technologies, Sustainable Energy Solutions, and Earthly Labs. These leaders are tasked with spearheading the next chapter in Chart's Nexus of Clean — an interconnected suite of products and services for the power, water, food, and industrial sectors. The Nexus of Clean covers more than 40 product and technology solutions in the natural gas, natural gas reforming, carbon capture utilization and storage (CCUS), hydrogen gas storage, water electrolysis, water treatment, hydro power, hydrogen distribution, and hydrogen liquefaction industries.

Chart Hydrogen Test Site In New Prague, Minnesota

With so many moving parts, the Nexus of Clean can be a lot to take in. By empowering its people to develop new ideas, Chart is laying the foundation for highly functioning independent nodes that support a larger network of design and innovation. "We're very privileged to have, as a result of our acquisitions in the Nexus of Clean, all of the founders and CEOs of those businesses decide to stay in the Chart family," said Evanko. "In order to harness their amazing intellect, entrepreneurial spirit, and start to leverage the inter-linkages among clean power, water, food, and industrials, we accreted our Founders' Innovation Team. These Founders continue to run their businesses but have joined forces to come up with innovative ideas on bringing their individual products or technologies together. And we've already seen immediate impacts to the business."

UNLOCKING THE HYDROGEN ECONOMY

LAT acts as a critical pillar that supports Chart's hydrogen liquefaction business and complements CCUS, hydrogen gas storage, water electrolysis, and hydrogen distribution in the Nexus of Clean. "As we looked at our business, we asked, 'where is the future going?' The one thing you hear every government and public sector official, private industry company, and shareholder talk about is sustainability," said Evanko. "We tend to get very US-centric when we think about addressing the problems of carbon emissions. If you look at the broader globe and you look at where populations don't have power or water, what do you think they're going to pick first? I'd pick clean water, per-

Continued on page 18

ChartWater's AdEdge Flow Reversal Reverse Osmosis (FR-RO) System Installed Within A Tribal Community In Arizona

sonally. I'd start there and then you can address the power situation. I think you're going to start seeing more clean power and clean water applications going together. You're also going to start to see the way CO_2 capture works with food and beverage, as an example. So, the Nexus of Clean is important to think about and, at Chart, we serve that across the board."

Hydrogen's role in the Nexus of Clean continues to advance, and Chart offers a myriad of technologies and solutions to advance the hydrogen economy. Evanko looks at the hydrogen value chain in three segments — hydrogen production, hydrogen storage and transport, and hydrogen end use. "Most of the current investment is in bucket one, in the production of molecules," said Evanko. "You'll hear people talk about 'how do we get the cost down? How do we scale up?' But, at the end of the day, the entire set of three buckets [hydrogen production, hydrogen storage and transport, and hydrogen end use] have to work together in order for this industry to get to a point where hydrogen is self-sustaining — where it isn't reliant on credits or public sector funding."

With more than 57 years of hydrogen experience, Chart has negotiated the shifting demands of the hydrogen economy firsthand. "Prior to 2019, discussions on hydrogen were primarily related to space exploration," said Evanko. "Enter 2020 and the universal shift to sustainability, and hydrogen became a household word. Fast forward to 2021, and we've seen an incredible amount of traction and progress."

According to Evanko, to date, US$500 billion in hydrogen investment has been announced through 2030. "If you looked at that figure a year ago, it was US$350 billion," she said. "So, there was a real meaningful shift in a matter of three, or four, or five months from US$350 to US$500 billion, with very tangible projects."

Evanko noted that there are currently 75 countries with net-zero targets, and more than 30 have hydrogen strategies. Breaking it down one step further, Evanko shared that 228 hydrogen projects are currently under development globally, 85% of which are in the European Union, Asia, and Australia, and that number is growing. While the increased interest and investment in hydrogen is encouraging, Evanko cautioned that it is important to acknowledge that the technology that exists today, especially in the production of the molecule, is not the technology that will achieve the planet's 2050 emissions goals. "There has to be more innovation that happens," said Evanko. "We have already seen that in the last couple of years. For example, what used to be an acceptable electrolyzer is no longer deemed efficient. Continued innovation is important, and that is one of the things that we at Chart believe in. There are going to be a lot of different ways to accomplish emissions reductions, a lot of different technologies that are going to play in the entire ecosystem."

Geographically, hydrogen activity varies. Data shared by Evanko show that the United States is beginning to move to networks/scaling of infrastructure. State-level activity is still extremely varied, but the development of hydrogen hubs is happening. In Canada, a national hydrogen strategy supports investment but provinces and localized demand drives behavior, which shows a growing trend toward liquid hydrogen.

"We are starting to see various stages of investment around the world," said Evanko. "South Korea and Australia, I think, are the next regions that are going to be

spending more and more investment dollars in hydrogen. India and South and Central America are at different stages of that evolution. India, for example, is focused on getting power to a broad set of the population. There's still natural gas investment in infrastructure happening. In the background, there is development of a hydrogen strategy with projects focused on industrial, green hydrogen."

Evanko continued, "To date, most of the spending has been in bucket one and bucket two [hydrogen production and hydrogen storage and transport]. I think we're going to start to see bucket three [hydrogen end use] speed up a little bit. Because, what do you do if you now have plenty of hydrogen available? Can you move it around? But where does it go? And who's using it? And if I'm driving a heavy-duty truck and I want to go from California to New York, I need places to stop to fill that. We're going to start to see more spent in bucket three; certainly that's what we anticipate in the coming year."

THE IMPORTANCE OF INVESTING IN ESG

Environmental, social, and governance (ESG) investments are accelerating. According to a study by Bloomberg ESG and Thematic Investing, global ESG assets could exceed US$53 trillion by 2025, representing more than a third of the US$140.5 trillion in projected total assets under management. ESG regulations and reporting standards are also improving. In March, the Securities and Exchange Commission (SEC) announced a proposal to standardize ESG disclosures by companies and other registrants. The SEC believes that some sort of order is needed in the metrics that companies report and the way in which they circulate those numbers. The SEC wants investors to be able to better understand a company's climate-related risks and how it manages those risks relative to its peers. Another major point from the proposal would require companies to quantify the financial impact of these risks on its short-, medium-, or long-term performance.

DEFINING PROGRESS

Companies that invest in ESG now stand a better chance at sustaining relevance and defining progress in the decades to come. Chart's role in the energy transition touches several different industries across a variety of sectors. Companies like Chick-fil-A, Linde, Air Liquide, IVECO, Air Products, Shell, Chevron, ExxonMobil, New Fortress Energy, Plug Power, United Launch Alliance, and Blue Origin have been purchasing Chart's products for more than 30 years. With a growing portfolio of solutions and customers, Chart's widening Nexus of Clean has the potential to reduce the environmental footprint of existing industries while influencing the paradigms of newer industries that are still early in their growth trajectories.